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Broader Use for Alloy Steels

Engineering Progress Demanding Stronger Steels—New Combinations Developed—A Chromium Rail Steel—New Uses for Molybdenum

BY W. J. PRIESTLEY

ALLOY steel represents an important part of American steel production and has shown broader development than is indicated by the increase in the total steel tonnage. The progress made in the automotive, aircraft, electrical and chemical industries would not have been possible without the use of alloy steel and the advantages it offers compared with simple carbon steel and iron. It is not my purpose to discuss the technical details of alloy steel, but rather to give in a general way a description of some of the new developments and explain how the changes from carbon to alloy steel have affected the industries mentioned.

Engineering Developments Demand Better Steels

IN this age of progress, engineers have not been satisfied with the properties offered by simple carbon steel. Engineering research has developed the knowledge that certain other elements besides carbon may be alloyed with iron to give greater strength for a given weight, greater hardness for a given carbon content and greater toughness combined with more resistance to shock and fatigue. They have also learned that certain elements, added to steel, offer greater resistance to oxidation and corrosion.

During recent years, all branches of American industry, especially the automobile and transportation, have greatly increased their use of alloy steel. At the present rate of production of automobiles, it is estimated that at least 20 per cent of the total steel produced in this country goes into this industry. This, of course, is not all alloy steel but it is safe to say that approximately 50 per cent of this steel might be termed alloy steel of one grade or another.

The general use of alloy steel has made us the pioneers and world's largest producers of automotive and agricultural machinery. Our own factories not only supply all the home consumption, but export annually machinery of this description valued at millions of dollars.

Aviation Progress Due to Alloy Steels

We marvel at what has been accomplished in aviation, which is 25 years old—the progress made has exceeded all expectations. Such feats as crossing the Atlantic and circling the North Pole could not have been possible with the airplanes made 10 years ago. The steel then available did not possess the strength, combined with the lightness and durability, necessary to make these long-sustained flights possible, and it is not an exaggerated statement to say that the modern airplane owes its endurance performance to the development of special alloy steel.

Expansion and developments in the chemical industry, where operations have been carried on at higher temperatures and higher pressures under the most severe conditions of corrosion and oxidation, offered problems when simple carbon steel was used for the construction of apparatus. This led to much research work as to what elements might be added to the steel to overcome the rapid deterioration resulting from corrosion and oxidation. The chemical industry in this country is still in its infancy and we already know, from the results obtained with the use of alloy steels, that they are going to be an important factor in its further development.

It is amazing to see what results are being accomplished in the mining industry today as compared with several years ago. Competition is so keen that only those com-

Some Special Types of Alloy Steels

Rail steels containing 0.30 per cent carbon and 3 per cent chromium are now being tried in this country.

Manganese steels with 1 to 2 per cent manganese are widely used. Additions of molybdenum or chromium are found advantageous.

Silico-manganese steels are gaining in favor, there being several combinations of these alloying elements.

Aluminum-chromium-molybdenum steels now employed for nitriding with ammonia gas.

panies survive which can maintain a maximum production at the lowest cost. The same thing is true in the oil industry. Drilling must be done faster and wells must be drilled deeper, to make operations pay.

In steam and electrical engineering, plants that were built 10 or 12 years ago are being redesigned and replaced with equipment which will operate at greater steam pressures and higher temperatures. Development in this field has been so rapid during the past few years that steam generator plants for the development of power are threatening hydroelectric plants which, a few years ago, were looked upon as the most economical means of making electric power. In the metal-working trades, mass production has revolutionized the methods of manufacture. Steel has been made that can be machined faster, and metal-cutting tools have been developed which make this possible.

Many of these changes, brought about by our modern methods in industry, have been made possible by changing from simple carbon to alloy steel. In its modern sense, the term alloy steel is very broad and we have learned that, while an alloy of one kind may be highly satisfactory for one purpose, it may not be better than simple carbon steel for another purpose. Therefore, in discussing this subject, we shall deal with the most important alloys used in the manufacture of steel and describe the special properties they impart and explain how the different steels are used to advantage.

Manganese—1 to 2 Per Cent Grades Widely Used

MANGANESE is the most essential alloying element used in the manufacture of steel. In amounts between 0.40 and 0.60 per cent, manganese is used as a deoxidizer, and an antidote for iron sulphide, imparting better rolling properties to the steel. In this amount manganese is not considered an alloying element.

It has been found that steel containing 1.50 to 2.00 per cent manganese possesses greater strength and toughness, after heat treatment, than simple carbon steel; and there has been a decided increase in the use of steel of this analysis. With low carbon, this type of steel is satisfactory for case hardening, as it has a soft, tough core and will take a hard, uniform case.

This steel is also being made with carbon content under 0.10 per cent for the manufacture of seamless tubing and wire. It responds readily to heat treatment and produces an extremely tough metal with moderate tensile strength. A special grade of this steel, containing around 0.10 per cent sulphur, is being used for certain parts where free cutting properties are desirable. The high sulphur facilitates machineability and the high-manganese content gives good rolling properties and, at the same time, better physical properties than may be obtained from ordinary high-sulphur, free cutting steel. The addition of small percentages of zirconium to this high-sulphur steel greatly improves the rolling properties.

When other alloys like chromium and molybdenum are added to 1.50 per cent manganese steel, improved physical properties are obtained. It is sometimes made with 0.25 per cent molybdenum or 0.75 per cent chromium.

Rail Steels of Special Manganese Content

One of the most interesting developments with this grade of steel is its use for rails. For the last 10 years, engineers have spared neither time nor money investigating the cause for rail failures in service and every effort has been made to obtain better and stronger rails for the safety of the traveling public. As a result, engineers recently made comparison between the life of old Bessemer rails and more recent open-hearth rails, and it was found that Bessemer lasted longer than open-hearth rails, and that they contained a higher manganese to carbon ratio. This has resulted in a number of railroads recently rewriting their open-hearth rail specifications so as to obtain lower carbon and higher manganese. These specifications call for 0.70 per cent carbon and 1.50 per cent manganese. It is claimed by many engineers that rails of this analysis will wear longer and give better service.

Progress has been made in building up, with the use of welding rods, worn manganese castings of Hadfield analysis; 14 per cent manganese steel has been used for many years for making special railroad parts subject to excessive wear and abrasion. In the past, when these wore out, they had to be replaced, but methods have been devised for building up the worn parts by the use of welding rods containing high percentages of manganese and chromium. These rods contain 4 per cent manganese and 3 per cent chromium, and may be welded with the oxy-acetylene torch.

Silicon—Several New Types

SILICON steels have contributed much to recent developments in electrical engineering, and the present-day efficiency of electrical motors, generators, electric magnets and transformers has been due to the better electrical properties obtained for these parts from a steel containing 4 to 5 per cent silicon. Steel of this analysis has high magnetic permeability and greater electrical resistance accompanied by less watt loss. Improvements in this steel have required greater freedom from impurities, and manufacturers of electrical sheets have made the most exacting demands upon ferrosilicon manufacturers for alloys of the greatest purity.

The use of silico-manganese steel, containing 2 per cent silicon and 0.80 per cent manganese, for leaf springs and other automotive parts has greatly increased of late. Spring steel of this type is also made with chromium and vanadium.

In the chemical industry, castings containing between 14 and 15 per cent silicon are used for handling corrosive liquids and gases. On account of the resistance of this kind of metal to sulphuric acid, nitric acid and acetic acid, apparatus handling these acids is made of this metal. This metal cannot be forged or rolled, and no heat treatment has yet been developed to refine the large grain structure and eliminate the extreme brittleness.

Silicon Steel for Structures

There has been increased interest in the use of so-called silicon steel for boiler plates and structural purposes. Strictly speaking, this is not a silicon steel in the sense of the other steels mentioned heretofore. Boiler steel contains as high as 0.90 per cent manganese and up to 0.30 per cent silicon, so that the improved properties in this type of steel do not come from the increased silicon content alone, but are also affected by the higher manganese. Boiler steel of this analysis has a higher tensile strength and yield point and may be fabricated as readily as ordinary carbon boiler plate.

Silicon bridge steel contains up to 0.40 per cent carbon, 1 per cent manganese and 0.40 per cent silicon, and is used on account of its greater structural strength.

Chromium—Its Many Applications

CHROMIUM has played a greater part in the development of alloy steels than any other metal. It may be used alone as an alloying element to increase the strength or hardness of simple carbon steel; but its general use is in combination with other alloying elements like nickel, vanadium, molybdenum and tungsten.

A small amount of chromium accentuates, or makes more pronounced, the special benefits derived from other alloying metals. It has been called the most useful and economical alloying element. It covers a wide range of uses from soft-cored carburizing steel to ball-bearing steel of full hardness. With higher percentages of chromium,

we obtain stainless steel and the various grades of non-corrosive and non-oxidizing steels. Chromium goes into solid solution with iron in the form of a carbide-producing steel of higher tensile strength and greater elastic limit. It increases the resistance of steel to impact and raises the fatigue value.

The amount of chromium ordinarily added to steel for increasing its strength and physical properties varies from 0.50 to 3 per cent. When added in amounts between 12.50 and 14 per cent, it produces a hard steel which resists corrosion after heat treatment. With this same amount of chromium and carbon under 0.10 per cent, we have what is called rustless iron. Recent developments utilize chromium in much higher percentages—in some cases up to 28 per cent, to obtain special properties which will be described later.

Several High-Chromium Steels Developed

Recent developments in the use of chromium in higher percentages are so varied and cover such a large field that only the most important will be mentioned here. Success has been obtained with the use of chrome-iron containing 22 to 28 per cent chromium in commercial cracking of gases. Metal of this analysis will resist both corrosion and oxidation and has replaced heavy steel tubes lined with copper. Chrome-iron is being used with much success for oil burners, carbonizing boxes, ore roasting parts, furnace parts, electric furnace grids and other parts which were subject to rapid oxidation when made of carbon steel.

Chrome-iron containing small percentages of nickel, when made in the form of castings and rolled products, is being used for installations where sulphur and sulphur gas are present. For mechanical equipment in mines, cement mills and quarries subject to excessive wear and abrasion, good results are obtained with a metal containing 26 per cent chromium and 2 to 3 per cent carbon. Metal of this analysis resists abrasion and wear and shows a Brinell hardness of over 500. It is frequently used to replace 13 per cent manganese steel.

With a low-carbon content, chrome-iron containing 26 per cent chromium has strength and ductility equal to some of the common grades of heat-treated alloy steel. It is non-hardening and may be annealed by quenching in water from 1650 deg. Fahr. It can be forged, rolled, easily machined and welded, and is being used in the form of bars, plates, sheets and seamless tubing in a number of industries.

When 10 per cent nickel is added to chrome-iron containing 28 per cent chromium, this metal will resist oxidation and corrosion at temperatures as high as 2100 deg. Fahr. In oil refineries, where the tendency is to increase temperatures and pressures, this metal in the form of castings has been replacing simple steel and showing six and seven months' service, where plain carbon castings deteriorated in a much shorter time.

Sulphur Increases the Cutting Properties

Since rustless iron and stainless steel are used for many parts requiring a smooth machined finish and, in many other cases, a ground finish, the users of these metals were often confronted with the problem of getting a smooth machined finish. For other purposes, they were confronted with the problem of obtaining a free cutting chrome-bearing steel which could be cut rapidly and economically with ordinary machine shop tools and equipment. It is particularly necessary to get a smooth finish on pump shafts, valve stems, gate valve seats and similar parts requiring a close machine fit.

Considerable experimenting was done with the use of sulphur, having in mind that the addition of 0.10 per cent of this element generally gave free cutting properties to ordinary carbon steel. While this improved the cutting property of stainless steel, it produced objectionable red shortness in the steel when it was rolled or forged.

After considerable research, it was learned that if the sulphur existed in the steel in the form of zirconium sulphide, the steel might be rolled equally as well as other steel and still obtain its free cutting property as well as its resistance to corrosion. Steel of this character containing 0.10 per cent carbon and 14 per cent chromium is serving a useful purpose on the market today.

A Nickel-Chromium Rustless Iron

There is another metal rapidly coming into use which contains 18 per cent chromium and 8 per cent nickel. In some cases this is made with carbon under 0.10 per cent and in others with carbon under 0.07 per cent. This metal is said to resist corrosion up to 2100 deg. Fahr., and the facility with which it may be forged, rolled, pierced and cold drawn makes it available for use in many different industries. Cold working hardens it the same as ordinary steel and methods have been worked out so that it may be softened to any degree desired by heat treatment.

It is now being used with excellent results in the form of sheets and seamless tubes, and with considerable success in the oil industry and in chemical plants making nitric acid. Sheets of this metal can be deep stamped and cold drawn and are being used to make cooking utensils, tableware, desk sets and automobile trimmings. When polished, it takes a mirror-like finish and will not tarnish or rust.

We understand that in Germany this metal is being

AT the invitation of the Lehigh University Metallurgical Society, Bethlehem, Pa., W. J. Priestley delivered an address, presented here in abstract, before that organization on Thursday evening, April 25, on "Review of Recent Developments in Alloy Steels." Mr. Priestley is vice-president, Electro Metallurgical Sales Corporation, New York, and has had a broad experience in the production of many kinds of alloy steel. At one time he was in charge of the large electric furnaces at the steel plant operated by the United States Navy at South Charleston, W. Va. The address, which was preceded by a dinner to the lecturer, was attended by a number of steel executives from the surrounding territory.

W. J. Priestley

made in the form of seamless tubes for the oil-cracking industry up to 12 in. in diameter, and as small seamless drawn tubes for hypodermic needles a few thousandths of an inch in diameter. It can also be drawn into wire as small as one thousandth of an inch in diameter and we understand that one firm is now looking forward to doing considerable business in the manufacture of wire screening made of this metal.

Aluminum, Chromium, Molybdenum Steel for Nitriding

Under the heading of chromium, we might very well classify a new steel which is coming into prominence very fast. This is a steel, usually containing aluminum, chromium and molybdenum, which takes a very hard outer case when heated to a low temperature in ammonia gas. A typical analysis of this steel will show 0.25 per cent carbon, 1.25 per cent aluminum, 1.50 per cent chromium and 0.20 per cent molybdenum.

When heated to 950 deg. Fahr. the aluminum present has a very strong affinity for the nitrogen of the ammonia gas. This makes it possible to use this steel for parts of more intricate shape for a case hardening than was formerly possible by the old methods of case hardening using carbon or other materials.

While this outer case of nitride is comparatively thin, not over 0.03 in. in thickness, it has extreme hardness and unusual wear-resisting properties. Brinell hardness tests have shown from 900 to 1100 hardness, compared with 742 Brinell hardness on a 0.50 per cent carbon chrome-vanadium steel and 550 Brinell hardness on a 0.80 per cent carbon steel.

One of the principal advantages claimed for the nitriding process is the close tolerances that may be maintained on close machined parts without the danger of distortation and deformation.

Rail Steel Containing Chromium

Under the heading of manganese, we mentioned changes that are being made by railroad engineers to obtain rail steel with lower carbon and higher manganese content. At the present time, an investigation is being carried on by some railroads as to the use of small percentages of chromium in rail steel. A steel of this character is not new, since rails of this type were made by the acid Bessemer process in England in 1913 and have shown exceptionally long life under the heaviest kind of traffic. Rails containing 0.50 per cent carbon and 1 per cent chromium are reported to have been in service, under the most severe traffic conditions, for the last 13½ years and are not yet worn out. High-carbon rails, under the same service, have shown a life of 2½ years.

There is now under way in this country an experiment to determine the life and wearing properties of rails containing 0.30 per cent carbon and 3 per cent chromium. While steel of this analysis has never been used for rails, as far as we know, it has proved very satisfactory for engineering purposes in England and has properties that make it equal to some of the more expensive grades of alloy automotive steel.

There is also a demand for a steel containing 4 to 6 per cent chromium and 0.10 to 0.20 per cent carbon. This steel has high physical properties and can be readily rolled into seamless tubes and sheets. It is used in place of plain carbon steel where service is hard and atmospheric conditions cause rapid rusting or corroding of simple carbon steel.

Three per cent chrome steel, with 1 per cent carbon, is being used in considerable quantities for making hardened steel rolls for use in rolling hot and cold strip steel and aluminum sheets, where a very smooth finish with close tolerance to size is desired. Steel for rolls of this kind must be very uniform in composition and hardness so as to retain a smooth surface. It is common practice to grind them to a mirror finish in order to obtain the smooth surface desired for cold-rolled strip steel and aluminum sheets.

Nickel—New Special Alloys

An alloy containing nickel and molybdenum has recently been developed for use in the chemical industry. This alloy makes excellent castings and can be forged and rolled into sheets. It has high tensile strength and good ductility and is readily machinable. This alloy was developed particularly for resistance to hydrochloric acid. It is very resistant to all strengths of this acid in the cold and while the rate of attack increases with rise of temperature, the actual rate of solution is very slow, even at the boiling point. In general, it may be said that this alloy is 10 to 18 times as resistant to hydrochloric acid as any commercial alloy that we know of at the present time. It also stands up very well in sulphuric acid but it is not resistant to nitric acid nor to wet chlorine.

While this alloy cannot be made for as low a cost as the iron-silicon alloys for handling sulphuric acid, it is believed that, when made up in sheets instead of castings, this alloy can be made at a lower cost and can probably compete with the iron-silicon alloys for most sulphuric acid applications.

When chromium is added to the above nickel-molybdenum alloy, the workability and strength is reduced and it must be used in the form of castings. It is still machinable, however, and the effect of the chromium on the chemical properties is to make the alloy resistant to nitric acid and to wet chlorine, and to increase resistance to sulphuric acid without any appreciable change in its resistance to hydrochloric acid.

Another new development is a metal composed of nickel and silicon. This is a casting alloy more nearly of the type of the iron-silicon alloys, but, instead of being very brittle, it is very strong and decidedly tough. It is not readily machined, but makes excellent castings. It shows good resistance to hydrochloric acid and excellent resistance to sulphuric acid, but is not resistant to nitric acid. This alloy will be somewhat less expensive to make than the other two mentioned before.

While these alloys may not wholly replace others, which can be made for lower prices, nevertheless for certain uses, where first cost of installation is not so important, these alloys will find a field. All three are resistant to alkalies and can be welded readily by means of the oxweld-acetylene torch. Laboratory tests made on welds have shown the same resistance to acids as the unwelded metal, which is quite unusual.

Molybdenum—New Uses Developed

There was a large increase in the use of molybdenum during the past year for both castings and rolled parts. This alloy has considerable merit when used in combination with other metals like chromium, nickel and vanadium.

A popular analysis contains 0.30 per cent carbon, 1 per cent chromium and 0.20 per cent molybdenum. It is used for many parts in automobile construction and aircraft work where there are unusual torsional stresses. It has also been popular for aircraft work on account of its air-hardening properties and weldability. It is desirable in the modern airplane, where the greatest possible strength is desired with the minimum amount of weight.

Chrome-molybdenum steel lends itself very well to piercing and drawing into thin-walled tubes; in some cases as thin as 0.035 in. thickness. It can also be rolled into very thin sheets, so that it is highly adaptable for building up the fuselage construction of seamless tubing

and the wings of sheets. For the torsion parts of automobiles like driving shafts, an alloy steel containing chromium, nickel, vanadium and molybdenum has been found very serviceable. Plain nickel-molybdenum steel has certain properties which make it desirable for case hardening bearings and other carbonizing parts. It responds readily to heat treatment, which gives it a soft, tough core and a hard case, from a single quenching.

In the casting field, chrome-molybdenum castings have given very good results. When properly heat treated, this grade of steel has an exceptionally high yield point and high Izod figures. It is claimed by one authority that the addition of 0.20 per cent molybdenum to steel castings will raise the Izod figure at least 10 ft.-lb. It is also desirable for certain intricate-shaped castings which will not withstand water or oil quenching. It has peculiar air-hardening properties which make it desirable for this kind of work.

Stellite—Coating for Cutting Tools

RECENT developments have taken place in the use of a compound of chromium, tungsten and cobalt known as Stellite. Made for a number of years in the form of castings, it has found popular use in the oil fields and automotive industry where mass machining production has been essential. It is noted generally for its resistance to heat and abrasion, retains its hardness up to 1800 deg. Fahr., and possesses the unusual quality of being tougher at red heat than when cold.

A process for coating the surface of cutting tools with Stellite has recently been developed—done by welding a layer of Stellite from a Stellite rod on to the face of the tool which does the cutting. One of the most notable applications for this kind of work is in the oil fields where the cutting edges of drill bits are faced with Stellite, giving three to five times longer life than old drill bits. It has also found practical application in the steel, mining and cement industries for coating castings and other metal parts subject to excessive abrasion.

Electric Furnaces and Conclusions

WHILE all alloy steels are not made in electric furnaces, a great many of the heat-resisting metals are made in this type of furnace. Progress has been made in such equipment during the past few years.

Ten years ago there were 233 electric furnaces in use in this country for making alloy steel and castings. Today it is estimated that there are 590. At that time, the largest electric furnace in use was 20 tons capacity; today 100 tons capacity is not beyond the realm of possibility. The problem is to obtain sufficient power to melt steel uniformly, accomplished by using more electrodes.

In order to keep pace with this progress in the development of electric melting furnaces, manufacturers of electrodes have done their share. It is now possible to obtain commercially satisfactory graphite electrodes 18 in. in diameter, and amorphous carbon electrodes 40 in. in diameter. The largest used, however, on steel melting furnaces is 24 in.

Another development is the induction furnace. A number of these furnaces have been installed during the past year and are being used to advantage for making low-carbon steel when the carbon ordinarily picked up in an electric arc furnace is objectionable. Another advantage is the freedom from oxidation of the metal and from absorption of gases. It is more like the old-fashioned crucible where you obtain exactly what you have in your charge, with the exception of carbon and silicon, which are appreciably lowered.

In summarizing and drawing conclusions it may be safely said that there is a definite trend in every industry toward the use of material that will make construction more permanent. Builders of new equipment are relying more upon the advice of metallurgical engineers and are following their recommendations for making installations of a more permanent nature. A great deal of sales resistance had to be overcome in getting alloy steel specified in place of simple carbon steel.

More people are beginning to realize that, although the first cost of construction may be cheaper when simple carbon steel is used, it is not the most economical in the long run. The operating time lost, resulting from tearing down and rebuilding equipment is an expensive item when operating units are pushed for maximum production.

We are entering a new era, in which alloy steel is going to play a more important part. The wisdom of its use has been clearly demonstrated in the automobile and aircraft industry, and we shall probably see changes in many other industries which have not yet used alloy steel.

Poisoning from Cyanides in Case Hardening

Evidently some rather unpleasant results have followed the use in Germany of cyanide in case-hardening operations, so much so that the German minister of health has issued special regulations as to the use of cyanide in such operations. According to *Chemische Industrie*, cyanide must be stored in vessels that can be tightly closed, and all storage and other tanks must be distinctly marked with the poisonous nature of the contents. Further facts concerning the regulations are as follows:

The shop must have level, smooth floors, which must be thoroughly cleaned at least once a day. The article to be case hardened must be thoroughly dry when introduced into the oven. The exhaust hood must be very closely fitting, and must not be opened except when articles to be case hardened are placed in the boxes or withdrawn from the boxes after having been case hardened or when the bath is to be recharged or emptied. The quenching vessels must be clearly marked "poison" and the quenching water must not be treated with acid under any circumstances. This water must be freed from dangerous soluble cyanide constituents by the addition of copperas until a grayish green or blue precipitate is formed. Operatives must wear an apron and gloves of strong materials, and also a protective mask against splashes.

Channeling of Gas in Blast Furnaces

It is generally known that channeling of the gas in the blast furnace shafts is undesirable and produces excessive dust inasmuch as the lifting power of the gas varies as the square of its velocity. Channeling is often regarded as an area of high velocity occurring at varying positions with respect to the walls and center of the furnace at different levels. That is, a channel might occur along the periphery at the top of the bosh and in the center of the furnace at a higher level.

Observations made on several industrial furnaces by the North Central Experiment Station of the United States Bureau of Mines, Department of Commerce, in cooperation with the University of Minnesota, indicate that areas of high velocity tend to persist from one level to another. If an area of low velocity exists at the periphery near the stock line, the same condition exists in a modified form at lower levels. Conditions were not the same in all the furnaces investigated. In some cases the gas velocities were higher near the walls while in others the gas velocities were higher in the central area. The size distribution, resulting from the physical properties of the charges, and the method of filling control the distribution of the gas in the shaft. Localized jets or channels might occur but these do not persist and are not so important as general areas of high or low gas velocity that result from size segregation during charging.

Diamond Tools for Metal Cutting

Speed of 1000 Ft. per Min., and Accuracy to 0.0001 In., with Mirror-Like Finishes, Obtainable—Large Output Between Grinds

BY C. L. BAUSCH*

THE diamond is a crystalline form of carbon and the hardest substance known. Diamonds are usually found in nature as single crystals, but they also occur as a conglomeration of tiny crystals, in which form they are employed to a certain extent in industry. These crystals are called "black diamonds" and "carbonados," and sometimes incorrectly "bort." Bort, however, is the proper name for discolored and faulty single-crystal diamonds not suitable for jewels, and it is this form of diamond with which this paper will deal. These crystals belong to the cubic system, generally assuming the form of an octahedron or a form symmetrically derived therefrom.

In looking into the history of the diamond and its industrial uses, the first mention the author has been able to find is in regard to its use in powdered form on a lap in 1476 for faceting jewels. For centuries apparently no further use of them was made, but in recent years they have become quite indispensable in industry

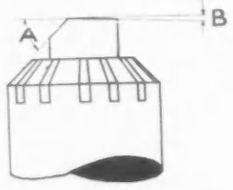


Fig. 1 — Diamond Tool of Standard Form for Turning and Boring

for cutting and drilling glass, porcelain, and other hard materials and for the making of draw dies for fine, accurately sized wires. They also find use as very fine graduating tools, and of late have been employed for turning and boring tools. The first use of diamonds for this purpose, the author believes, was by European instrument makers who used them for turning the taper on transit centers.

Diamonds are used generally where the material to be machined is too hard for a steel tool or where greater accuracy or better finish is wanted than can be obtained when using steel tools.

To make a good diamond tool for such purposes, a careful selection of bort is necessary, and then a very careful positioning of the diamond in its holder so that a cleavage plane will be parallel to the top surface of the tool. The cleavage planes in good crystals are very pronounced and are parallel to the faces of the crystal. In stones less well defined it is necessary for the diamond grinder to shift the stone around until he finds the grain by the ease with which the grinding is accomplished.

In the past some have made a practice of electroplating the diamond and then soldering it to the holder, but the best practice now seems to be to set and braze it into a steel holder. The end of the holder is bored to fit the diamond and is then slit with a number of saw slots as shown in Fig. 1; the diamond is then inserted

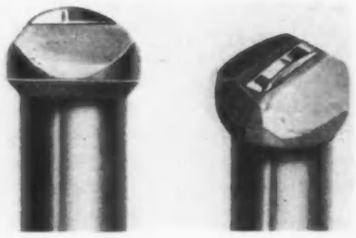


Fig. 2 — Top and Perspective Views of Special Form Radius Tool

in the hole and the tongues formed by the slots are pressed down to hold the stone, after which it is finally brazed into place.

Can Be Ground to Any Shape

Diamonds can be ground into almost any shape for special forming jobs, but for straight turning and boring a fairly well standardized form has been adopted. Fig. 1 shows this form, which has been found to give very good results. For turning tools, the angle *A* is made 45 deg. and angle *B*, 2 deg. The face clearance of *A*

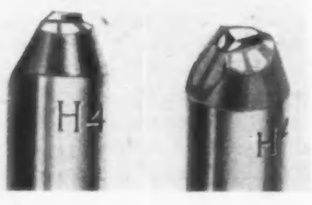


Fig. 3 — Top and Perspective Views of Regular Turning Tool

is about 10 deg., and of *B*, about 2 deg. This clearance angle of *B* varies somewhat with the type of work that the tool is supposed to do. On very hard material it may be made as great as 5 deg. For boring tools it is made 5 to 8 deg., depending upon the size of hole to be bored. In general, it is kept as small as possible and still have clearance. No lip angle is ever given to the top of the tool.

Facing tools require more clearance than turning tools, but less than boring tools. Good practice is about 3 to 4 deg.

Figs. 2-6 show diamond tools of several types. At the left of Fig. 2 is shown a top view and at the right, a perspective view of a special-form radius tool. Figs. 3-6 show respectively top and perspective views of a regular turning tool, a combined turning and facing tool, a regular boring tool, and a combination boring and facing tool. It will be noted that a secondary clearance

*Manager of research and engineering, Bausch & Lomb Optical Co., Rochester, N. Y. Abstracted from a paper contributed to the Rochester meeting, May 13 to 16, of the American Society of Mechanical Engineers. Although the practice outlined is that developed in the Bausch & Lomb plant, Mr. Bausch believes, from a study of the recent literature on the subject, that it is representative of the development in industry at large.

is shown on some of these tools—put on with the idea of clearing the heel of the tool.

The turning tool when used is tilted around so that the angle *B* becomes smaller where coarse feeds are used or when a specially brilliant surface is wanted on the work. When setting the tool for the latter purpose it must be kept in mind that this sort of finish requires really a burnishing operation after the cut is taken. The angle *B* is sometimes practically reduced to zero and the tool set above center so that the clearance face of the angle *B* becomes tangent to the work being turned. To further enhance this burnishing effect for very high polish, the tool is rotated so that the edge of the tool away from the cutting edge is higher than the other edge, as shown in Fig. 7, which is a front view looking at the work through the tool. This angle of tilt *C* may be as high as 45 deg. for turning very soft metals. It is obvious that this practice cannot be followed in boring.

Maximum Speeds Limited Only by Vibration

In attempting to tabulate results of his experiments in finding maximum possible surface speeds and feeds, the author was forcibly impressed by the fact that the

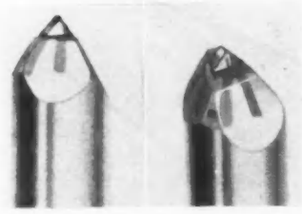


Fig. 4 — Top and Perspective Views of Combined Turning and Facing Tool

surface has not yet been scratched, so to speak, in this direction. The main limiting factor seems to be vibration. The diamond will stand any temperature as long as it is cutting freely and there is no vibration. Several machine-tool builders have awakened to this fact and are building special machines for diamond boring and turning. Big, generous bearings are needed, or rugged ball-bearing construction.

For turning work on centers, the author's company has found dead-center lathes with a spring pressure on the tail-center very satisfactory. This is not practical of

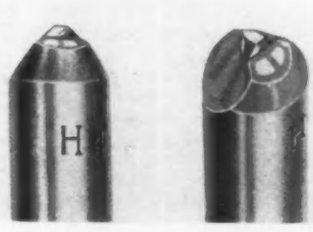


Fig. 5 — Top and Perspective Views of Regular Boring Tool

course on heavy work, but is difficult to better on work up to about 4 in. in diameter and 6 to 8 in. long. Where this practice cannot be followed or where ball-bearing spindles cannot be used, the machine must have well-fitted bearings and should be run in to normal operating temperature before really accurate work can be done. By taking these precautions it has been found possible to finish hard cast-bronze periscope heads 12 in. in diameter and about 30 in. long to within 0.0002 in. over their entire length. This job required two cuts, one on the rough casting and one finishing, running at 210 r.p.m. with a feed of 0.007 in. per revolution. A clearance angle of 5 deg. was used on the tool. The same tool was used on both the roughing and finishing cuts. In this case a higher speed and finer feed would have been better, but no machine was available to give these more ideal conditions.

Jump Cuts Can Be Taken

If everything is rigid, cuts can be taken over depressions and holes, over which the tool must jump, without appreciably affecting accuracy.

With the equipment regularly in use, surface speeds of 1000 ft. per min. are possible and feeds from 0.001 in. to 0.003 in. per revolution, with a depth of cut of from 0.015 in. to 0.025 in. on roughing cuts and 0.004 in. to 0.010 in. on finishing cuts. The author has found surface

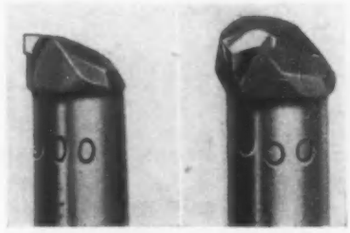


Fig. 6 — Top and Perspective Views of Combined Boring and Facing Tool

speeds of anywhere from 200 to 1000 ft. per min. being used, with no indication that the 1000-ft. speed shortened the life of the tool in the slightest degree.

The speed of turning is practically independent of the material being turned, the company having turned everything from soft babbitt to hard bonze that a steel tool would hardly touch, at substantially the same speed provided vibrations did not occur. With proper machine design and careful technique in the setting of the tool, wonderful results can be accomplished. Turning and boring accuracy to within 0.0001 in. is obtainable, and beautiful mirror-like finishes can be obtained which must be seen to be appreciated. Costs can be reduced greatly as it is possible to turn thousands of pieces with one setting of the tool—15,000 pieces in one case the author has a record of. This means the elimination of the frequent regrinding and resetting of the tool, a possible easing up on inspection, fewer rejections and securing at the same time more accurate work, a beautifully finished product, and the elimination of polishing costs which in some cases is a big factor. Work coming off the diamond turning lathes, if carefully handled, can go directly into the lacquering department.

Although the author has no definite data at hand, he can state that many of those who are using diamond tools on bearing metals feel that more satisfactory bearing surfaces are obtained than with other finishing methods.

Thin, Flat Parts Machined Economically

Diamond tools lend themselves successfully to the finishing of thin, flat parts that are ordinarily difficult

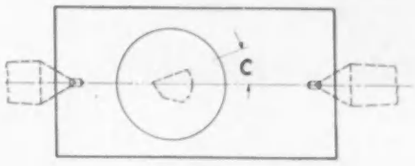


Fig. 7—Tilting of Tool to Obtain Burnishing Effect After Cut Is Taken

to clamp without distortion. Using a diamond which has no lip angle and hence no lifting component, it is possible to machine parts of this kind by clamping them very lightly against the edges.

Lubrication is not helpful in diamond machining except as a protection of the surface against tarnishing. There may be exceptions to this in working certain ma-

terials, but not within the company's experience. The author understands that lubricants have been used in working tough copper, but he has done this satisfactorily without their use.

It was originally the author's intention to tabulate definite data as to the proper angles of tools and the exact setting for different materials, but he finally decided that there were too many variables to make this practicable at this time. These variables are: hardness of the diamond, direction of the cleavage planes, shape of the tool, clearance angles, setting of the tool for height and angle, speed of work, depth of cut, feed, and physical characteristics of the material being machined, which latter, as is generally known, vary considerably even in supposedly similar material.

Notwithstanding this, it is now possible with standard-shape tools to train set-up men and operators in a short time to use diamond tools successfully.

Rapid Growth in Heavy Steel Rails

From Less Than 22 Per Cent in 1919, Sections of 100 Lb. and Up Have Advanced to Over 72 Per Cent in 1928

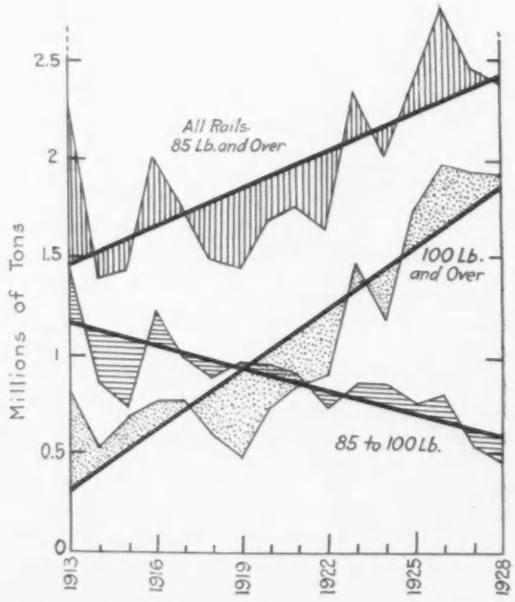
PRODUCTION of steel rails of the heaviest gages has made rapid progress in the United States since the conclusion of the World War. Rails of 100 lb. or more to the yard, produced in 1919, were only 21.73 per cent of the total production of that year. From this point each year except 1924 has shown a substantial gain over the preceding year. Thus the percentage went up to 28 in 1920, to 39 in 1921, to 41.57 in 1922 and to 50.47 in 1923. Following a slight set-back to 48.31 in 1924, the advance has been to 58.76 in 1925, to 61.12 in 1926, to 68.84 in 1927 and to 72.60 in 1928.

Correspondingly, there has been a reduction in the proportion of rails of less than 100 lb., which has brought those of 85 to 100 lb. down from about 44 per cent in 1919 to a little over 17½ per cent last year. Rails of 50 to 85 lb. have dropped from 22½ per cent of the total in 1919 to less than 5 per cent last year. Rails of under 50 lb. have dropped from 12 per cent in 1919 (and nearly 19 per cent in 1920) to about 5 per cent.

Light Rails Will Always Find Use

Because of their large use in mines and other localities where heavier rails are not required, rails of under 50 lb. may remain stabilized at about the present proportion of the total. They have averaged some 5¾ per cent in the past four years.

In the table will be found the record of the manufacture and exports of steel rails, beginning with 1913. Imports, having been something of a factor during a portion of that period, are shown also. It will be noted that the exports from 1915 to 1920 inclusive averaged more than 20 per cent of production, whereas during the last five years the average has been only about 7 per cent. Two diagrams illustrate the facts set forth in the table.



TREND line calculations show:

Rails, 100 lb. and heavier, increasing 96,000 tons a year.

Rails, 85 lb. to 100 lb., decreasing 36,000 tons a year.

All rails, 85 lb. and heavier, increasing 60,000 tons a year.

Compared with similar calculations on page 420 of our issue for Feb. 11, 1926, the heaviest rails have shown an increase in rate of growth, the earlier figure having been 64,000 tons a year. Rails of 85 to 100 lb. are declining faster than the 10,800-ton estimate of three years ago. All rails of 85 lb. and over were then gaining at 53,400 tons a year, a rate which now has advanced somewhat.

PRODUCTION OF STEEL RAILS IN THE UNITED STATES
(In Gross Tons)

Year	Total Production	Exports	Per Cent Exported	Imports	Percentage Distribution of Production by Weight			
					Under 50 Lb.	50 to 85 Lb.	85 to 100 Lb.	100 Lb. and Over
1913	3,502,780	460,553	13.15	10,408	7.72	27.61	....	64.67
1914	1,945,095	174,680	8.98	22,571	12.26	15.93	44.63	27.18
1915	2,204,203	391,762	17.77	78,525	11.53	23.51	33.70	31.26
1916	2,854,518	540,349	18.93	26,299	10.35	19.86	42.92	26.87
1917	2,944,161	510,439	17.34	9,263	10.47	29.98	33.62	25.93
1918	2,540,892	453,566	17.85	8,705	15.55	26.18	34.95	23.32
1919	2,203,843	652,449	29.61	17,008	11.97	22.49	43.81	21.73
1920	2,604,116	594,634	22.83	45,684	18.78	16.64	36.58	28.00
1921	2,178,818	322,107	14.78	22,048	9.71	9.87	41.43	38.99
1922	2,171,776	279,105	12.85	26,628	12.23	12.65	33.55	41.57
1923	2,904,516	267,409	9.21	29,705	9.39	10.36	29.78	50.47
1924	2,433,332	208,829	8.58	43,357	7.85	8.76	35.08	48.31
1925	2,785,257	151,690	5.44	36,871	5.87	7.89	27.48	58.76
1926	3,217,649	187,760	5.84	62,776	6.13	7.96	24.79	61.12
1927	2,806,486	175,539	6.26	16,145	5.76	6.18	19.22	68.84
1928	2,647,493	189,461	7.16	15,175	5.07	4.75	17.58	72.60

Heat-Treating Aluminum Alloys

Wright Company Uses Electric Furnaces for Treating Aluminum Alloy Parts for Airplane Engines —Five Furnaces of Two Sizes

BY FAY LEONE FAUROTE*

AN increasing use of electric furnaces in automotive and aeronautical manufacturing plants has led to the designing of some of the circular pit type for use in heat-treating aluminum alloys. These have the advantage of an excellent economy of power. For a given cubical volume, the radiating surface is practically a minimum. Furthermore, they offer a convenient means for the heat-treating of both small and large aluminum castings under almost perfect temperature control. They are capable of being filled and emptied with remarkable ease.

In the plant of the Wright Aeronautical Corporation at Paterson, N. J., there are two special installations, the product of the Electric Furnace Co., Salem, Ohio.

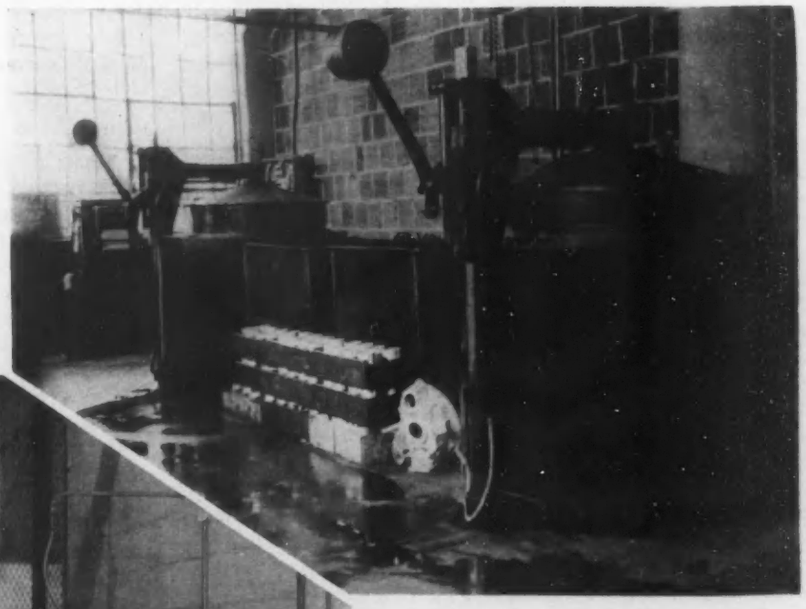
The first units to be installed were two small pit furnaces rated at 20 kw. each. They have a chamber diameter of 3 ft. 6 in. and an effective depth of about 30 in. The material to be treated is handled in steel baskets, placed in the furnaces and removed by means of a traveling crane. The basket clearance between the guide rails, which are used to protect the heating element, is 34 in.

Heating elements in each of these small furnaces are located on the side walls and also beneath the basket in the center. On account of the small size of this type of furnace, only one control zone is considered necessary. All the heating elements are in series and there is only one controlling instrument needed. The opening is at the top between the cover and the furnace walls.

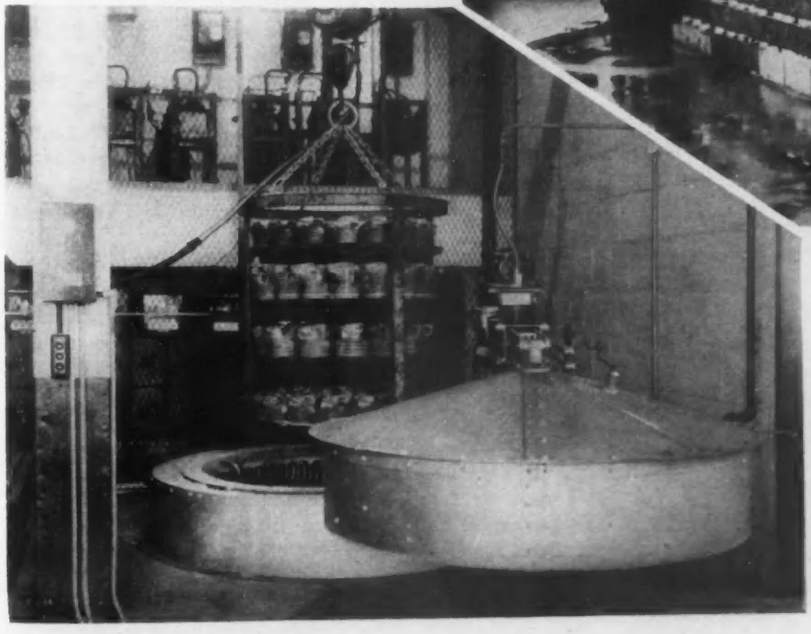
Furnace Cover Raised by Hand Lever

The cover-lifting mechanism, which is carried by a vertical column attached to the furnace shell plate, is manually operated. The operator raises the cover by means of a hand lever. As soon as the sand seal flange is clear

*Mechanical engineer, New York.



CYLINDER Heads on a Suspension Rack About to Be Lowered Into an Electric Heat-Treating Furnace (Below)



SPECIAL Electric Furnaces for Heat-Treating Crank Cases. The cover-lifting mechanism is carried by a vertical column (above)

of the top of the furnace, the cover swings aside, out of position, exposing the interior for either loading or unloading.

Four Large Furnaces Have Three Zones

Four other furnaces of the larger size have also recently been installed. They are rated at 60 kw. each and have a chamber diameter of 6 ft., with an effective depth of approximately 5 ft. The clearance between the guide bars is 5 ft. These furnaces, which have a greater depth than the others, require a separate control zone in the top and bottom in order to insure equal temperature distribution. So each of these furnaces has three zones, each under separate control and heated by individual sets in the upper, intermediate and bottom sections respectively.

Due to their size, the cover-handling mechanism, while similar in form to that of the smaller type, is arranged for motor-drive, thus relieving the operator of exertion in opening the furnace.

All of these furnaces are equipped with the Electric Furnace Co.'s standard cast grid heating elements, arranged to provide the maximum possible heat liberating surface. It is claimed that, owing to their rugged qualities, accidental damage to any of the elements seldom occurs.

In the Wright plant electric furnaces are used for heat-treating the various crankcase sections, cylinder head castings and pistons. Installed so that only a small portion of the upper part of the furnace extends above the floor, the top opening is only slightly above waist-high. When the cover is turned aside, the interior is in plain view, and loading and unloading are a simple matter.

Melting Metals in Vacuo

Better Qualities Result—Alloys Have Greater Ductility—Higher Chromium Contents Are Malleable—Gas Content Less

LABORATORY studies on the degasification of molten metals have been so fruitful that many have considered the application of these methods to a larger scale of operation. Various attempts, notably those of Jensen in England (1881), and Baraduc-Miller in Paris (1910), were made to subject molten steel to a vacuum at the end of the refining period. These earlier efforts were handicapped because they permitted degasification only for the length of time that the steel remained liquid without the application of heat.

More recent methods employ a vacuum not only during the melting, refining and finishing stages, but also during the casting of the metal. Complete degasification is essential to the production of sound ingots, since a small residue of gas would, under the low pressure, produce a large volume of blowholes.

Purpose of the Vacuum-Melting Process

To reduce shrinkage cavities in the castings is the first object of melting and casting in vacuum. This is done by pouring at an extremely slow rate, made possible by the absence of air. Thus an ingot of 300 kg. (660 lb.) requires 12 to 18 min., and one of 2000 kg. (4400 lb.) 40 to 60 min. In this procedure freezing is taking place during the pour, and a minimum of "piping" results.

A second aim of the process is elimination of blowholes, owing to the very complete removal of gases and oxides. As a result it is possible to cut a 2000-kg. vacuum-cast ingot into sections 10 mm. (0.04 in.) in thickness which will not show any blowholes under a magnifying glass.

A third purpose is the removal of undesirable impurities—oxygen, nitrogen, carbon monoxide and sulphur. Finally, also, a considerable improvement in ingot yield is obtained.

How the Gases Behave

A metal like iron, prepared by the usual methods of melting and casting, will evolve two or three liters of gas per kilogram (60 to 100 cu. in. per lb.), consisting mainly of CO and H_2. Although it was at one time thought that these gases were dissolved in the metal, it has since been shown that the CO is formed during degasification at low pressure by reaction between carbon and various oxides present, such as FeO, MnO, SiO_2, Al_2O_3, etc. The presence of hydrogen has also been traced fairly definitely to reaction between carbon or iron and moisture.

The effect of temperature on the elimination of gases from metals is most important. The solubility of certain gases increases while others decrease, with rising temperature. Hence it is important that the proper temperature be determined by experiment in order to obtain complete degasification.

Good Results Obtained

Some of the uses to which the process has been put are: Preparation of alloys for thermocouples of base metals; of supports and terminals for the elements of high-vacuum tubes, such as X-ray and radio tubes; of nickel-iron wires for sealing into the glass of incandescent light bulbs, and for producing highly pure iron with magnetic properties.

Alloys prepared by the vacuum process show generally much greater ductility and lower hardness than the usual product. For example, the limit of chromium in the heat-resisting nickel-chromium alloys is about 20 per cent. With more chromium the metal is unworkable. However, with the vacuum-melting process alloys up to 33 per cent of chromium can be prepared and worked without difficulty. Numerous other alloys, which are subject to oxidation in preparation in air, are made by this process, including nickel-chromium-tungsten and chromium-cobalt.

Improvement in qualities results in some cases from elimination of the non-metallic impurities. For example, the impact value of a certain chromium-nickel alloy was more than doubled when the vacuum process was substituted for an arc furnace method.

Process Now Being Used on Fairly Large Scale

Beginning in 1917 with the individual melts of 6 kg. (13.2 lb.), the process has grown so that in 1925 a charge of 4 tons (8820 lb.) could be handled. The yearly output had increased to 110 tons in 1927. Power consumed in the 4-ton furnace, with a cold charge and cold furnace, is approximately 857 kwhr. per ton, measured at the generator.

From an article by W. Rohn, *Zeitschrift für Metallkunde* 21 (1929), 12. Abstracted by John M. Gaines, Jr., assistant physical chemist, United States Bureau of Mines Experiment Station, Pittsburgh.

Status of Tungsten Carbide as a Cutting Material

Some Experiences of Users and Probable Effects on Machine Tool Design Outlined by A.S.M.E. Research Committee*

AT the annual meeting of the Special Research Committee on the Cutting of Metals in December, 1928, the chairman requested the Subcommittee on Machinability to investigate the possibilities attendant upon the use of tungsten carbide as a cutting tool material, and to make recommendations as to what action, if any, the committee should take with respect to this material. The subcommittee has made a preliminary survey by which it has sought to accomplish the following objectives:

1—To list the various brands of this material which are or will be available and to learn something regarding the concerns which are producing them.

2—To ascertain the extent to which industry has adopted tungsten carbide for production purposes and the results which are being obtained by its use.

3—To determine the probable effect which the use of this material will have upon the future development of machine tools, and to make a recommendation as to what action this special research committee should take with respect to such development.

At the present time there are two tungsten carbide products available in the United States: Carboloy, manufactured and sold by the Carboloy Co., New York, and Widia, manufactured by the Krupp company, of Essen, Germany, and imported by Thomas Prosser & Son, New York. The Wesson Sales Co., with offices in Detroit and Chicago, is agent for Widia in Western territory.

In addition to carboloy two other brands will be manufactured in this country, viz., Strauss metal and Dimondite. Strauss metal is the trade name of the product of the Ludlum Steel Co., Watervliet, N. Y., and Dimondite is the name of the tungsten carbide which will be manufactured by the Firth-Sterling Steel Co., McKeesport, Pa. This brand has not yet appeared on the market although it is being produced on an experimental scale and a comprehensive development program is being carried on.

Automatic Machines Equipped with Tungsten Carbide Tools

A survey of the results obtained by several concerns in the Chicago and Detroit districts indicates forcibly the far-reaching effect which this material eventually will have on machining operations and substantiates in a general way the published claims of the manufacturers. The experiences of the users of tungsten carbide interviewed seem to be in agreement in one important respect; that is, that the life of the tungsten carbide tools, where they can be used, is many times greater than that of high-speed steel tools.

A large valve company has tooled an automatic chucking machine with tungsten carbide tools for machining a bronze valve disk. The average life of high-speed steel tools was 600 to 800 pieces per grind while that of the carbide roughing tools was in the neighborhood of 27,000, the speeds, feeds, etc., being identical in each case. The part in question required a very good finish and for that reason it was considered advisable to continue to use a finishing operation. The tungsten carbide finishing tools had produced about 28,000 parts at the time of our visit, and were apparently as good as new.

Another manufacturer replaced high-speed steel tools with tungsten carbide tools for machining a malleable iron part having brass inserts. This operation likewise was performed on an automatic machine with no changes except the substitution of tools. The best tool life obtainable with high-speed steel was from 3 to 8 hr. operation per grind. The first set of tungsten carbide tools ran for over six weeks before requiring regrinding.

These cases are of particular importance because in each instance an automatic machine was completely tooled and placed in operation on a production basis.

A large automobile company has obtained data on drilling bakelite with a 9/16-in. drill. Results indicate that on a strictly comparative basis tungsten carbide tipped drills produced 10,700 holes per grind, the high-speed steel drills only 155. We have been informed that this corporation has several thousand dollars' worth of tungsten carbide tools in actual use for machining die castings, aluminum alloys, brass, bronze, cast iron, malleable iron, nickel steel and bakelite. Most of the experiences observed relate to the application of tungsten carbide to jobs in which no changes were made in the machines or, at most, only the speeds increased.

A large clutch manufacturing company found that by using tungsten carbide tipped drills and counterbores for drilling and counterboring bakelite-asbestos clutch plates it could secure in the neighborhood of 50,000 holes per grind as compared with a production of about 1000 holes with high-speed steel drills.

Changes in Machine Tools Will Be Incidental to Higher Cutting Speeds Required

It will be apparent that much of the tungsten carbide now in use has been placed in operation, first, in order to overcome machining difficulties and thus to decrease the "down time" which is ordinarily consumed by the frequent grinding of tools, and second, to obtain greater production by increasing cutting speeds where it has been possible to do so without danger of damaging the machines.

Wherever the speeds were increased it was, of course, necessary to install larger motors to give the additional power required. However, on account of the limitations imposed by the machines available, it has in no case been possible to utilize the maximum benefits

*Abstracted from a report of the Subcommittee on Machinability of the A.S.M.E. Special Research Committee on Cutting of Metals, contributed to the Rochester, N. Y., meeting of the American Society of Mechanical Engineers, May 13 to 16. F. C. Spencer, assistant superintendent machinery procurement, Western Electric Co., Kearney, N. J., is chairman of the subcommittee.

which could otherwise have been secured from the use of tungsten carbide tools.

It is questionable whether tungsten carbide will ever be capable of withstanding heavier cuts than are now customarily taken with high-speed steel tools and it would seem, therefore, that whatever machine tool developments will be required on account of the introduction of this new material will be largely incidental to the increases in cutting speeds which it is generally agreed are possible.

This committee feels that a great deal of development work must be done before machines can be designed with full confidence that they will be suited to the additional demands which will be thrown upon them. Assuming that the speeds are increased to the maximum which the tools can stand while maintaining the usual chip cross-sections, it will be apparent that a number of practical considerations must be taken into account, such as:

1—Bearing designs must be altered and additional rigidity provided throughout on account of the structural weakness of tungsten carbide. The cutting edges of tungsten carbide tools will break if appreciable chatter is permitted.

2—Chip disposal must be taken care of on a far larger scale.

3—Indications are that the problem of providing suitable coolant which has been so important heretofore may be eliminated.

4—In automatic machines the mechanism controlling the action of the tools must function in the minimum of time in order that the greatest advantage may be derived from the new material.

5—It is quite reasonable to suppose that fewer changes in speeds will be required and that there will be corresponding simplifications in spindle drives.

6—Lathe tailstock dead centers will not last with the cutting speeds which will be used and centers equipped with anti-friction bearings will be necessary.

Definite Machine Tool Developments Under Way

There are at the present time certain definite machine tool developments under way, having for their purpose the design of machines which will bring out the full possibilities of tungsten carbide. One well-known manufacturer of production boring machines has contracted to deliver several units which are guaranteed to stand up under the most severe conditions which may be encountered in the use of tungsten carbide. At least two manufacturers of special purpose lathes have undertaken the development of machines which will make it possible to rough turn and rough groove lynite pistons at speeds up to 1000 ft. per min.

The full import of these facts seems to be that certain machine tool builders have fully realized the possibilities of tungsten carbide and are endeavoring to take advantage of them as soon as possible. It is to be expected that any report covering this phase of the status of tungsten carbide will be out of date almost as soon as written. No doubt the machine tool builders will fall in line very rapidly and redesign many of their production machines, particularly those for use in industries which are taking an active interest in this development. The machine tool builders and the users will have to work this problem out together.

Some of the considerations which will have an important bearing on the question of how machine tool developments will be affected by the introduction of tungsten carbide tools have been mentioned. It remains to be seen to what extent the machine tool industry as a whole will be involved in this development.

It seems fairly certain that the whole bulk of the machine tools which fall into the class termed "production machines" will eventually require design modifications in order to comply fully with the newer requirements. At present, however, the status of the development of tungsten carbide tools would not warrant radical changes in the design of milling machines and drill presses, since neither milling cutters nor drills have so far been very successfully made up with tungsten carbide cutting edges for use in machining high carbon steel or alloy steel. As far as lathes and similar machines are concerned it is safe to predict far-reaching developments on the basis of what has already been accomplished.

It is quite certain that further development of tungsten carbide tools will proceed much faster than that of machine tools, and it would seem highly desirable, therefore, that the machine tool builders undertake immediately a comprehensive study of all the factors involved in the adoption of the new tool material with a view to effecting the transition as economically as possible.

Research Committee to Keep in Touch with Developments

In November, 1928, the A.S.M.E. main research committee, sensing the possibilities of tungsten carbide as a new cutting material, canvassed a large number of manufacturers and users of machine tools in this country for recommendations as to the part which the society might play through its research organization in determining the changes in machine tools that will be necessary to adapt them to the use of the new cutting material. The consensus of the replies was that a research committee of the society should be formed which could keep in touch with the development of tungsten carbide cutting materials and publish information frequently for the benefit of all those interested. A representative cross-section of the views expressed may be had from those which follow.

In pointing out the need for a systematic development program E. F. DuBrul, general manager of the National Machine Tool Builders' Association, said, "We can and ought to save all . . . intermediate steps. This can be done by a well-worked-out well-conducted research program, carried through by some neutral research agency, and financed by the producers of the cutting tools and the machine tool industry, jointly."

Ralph E. Flanders, manager, Jones & Lamson Machine Co., Springfield, Vt., felt that a thorough investigation should be instituted by the society's main research committee and that the cooperation of the National Machine Tool Builders' Association should be invited.

Prof. O. W. Boston, University of Michigan, Ann Arbor, Mich., wrote, "It further appears that a committee should be organized at least to keep in touch with what is going on, perhaps encourage the publication of results of tests and practice, and to act as a clearing house for information as to the influence of this material on design of machine tools."

Prof. J. O. Keller, Pennsylvania State College, State College, Pa., suggested that the committee "cooperate with the National Machine Tool Builders' Association in urging the latter association to expend money for the purpose of research along the lines suggested by their general manager, Mr. DuBrul, in his bulletin of Nov. 9."

This subcommittee agrees with Prof. Keller and recommends that the A.S.M.E. Special Research Committee on Cutting of Metals urge the formation of a new committee, by the society's main research committee, which shall have for its purpose the correlation of the activities of the various organizations which may be engaged in research connected with the development of machine tools to meet the newly arisen needs.

Gray Iron Electrically Melted

Small Foundry, Having Daily Output of Two Tons, Uses Methods Commonly Associated with Mass Production

THAT many of the methods commonly associated with mass production can be adapted to the plant having a small output is demonstrated at the new gray iron foundry of Hobart Brothers Co., Troy, Ohio. Although it turns out only two tons of castings a day, it is equipped with mechanical conveyors and a sand reconditioning system similar, on a greatly reduced scale, to those operated in foundries having many times its capacity.

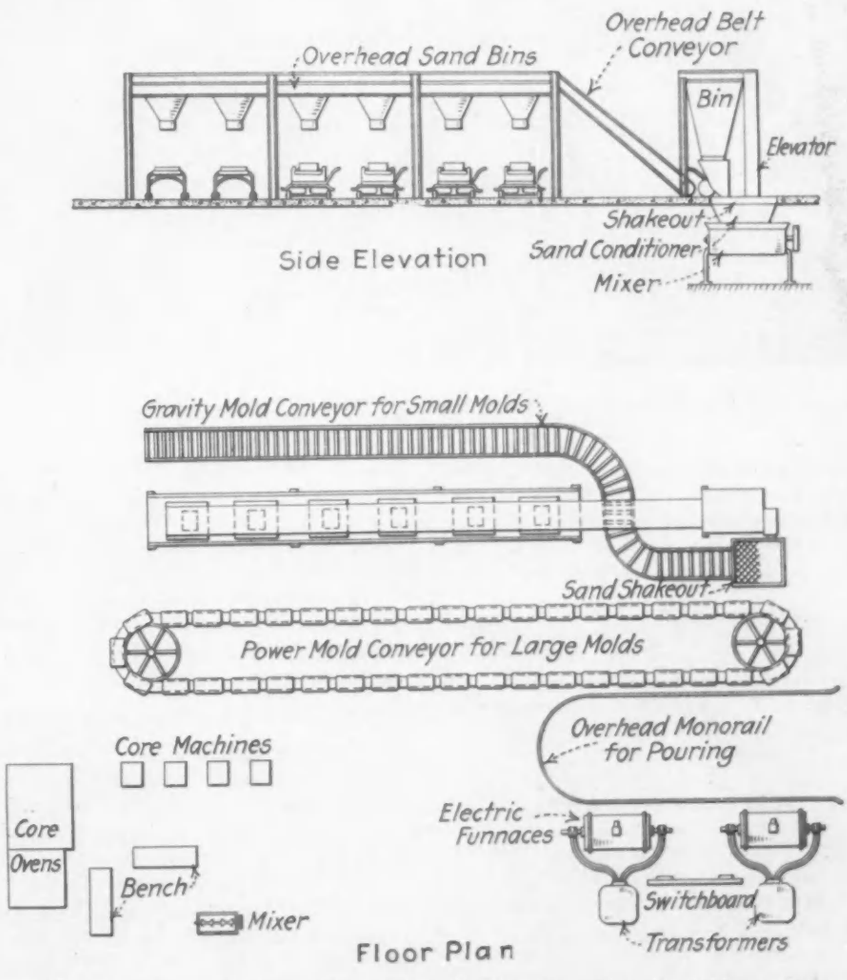
Iron Melted in Rotating Electric Furnace

But this is not its sole distinguishing feature. Gray iron is produced in a rotating electric furnace, which until recently has been used exclusively for melting brass. The charge consists of pig iron, machine shop borings and other scrap iron. Offhand the average foundryman would probably think that such a foundry might be practical, provided low costs were not the primary consideration. To a certain extent this is true, because factors other than costs played a considerable part in the decision of the management to operate its own foundry. Nevertheless, production expenses already have been lowered almost to the figure the company was formerly paying to a jobbing foundry for its castings, and improvements soon to be made should effect a further reduction to a wholly satisfactory basis.

When plans for the foundry first got under way, it was thought desirable to have them conform to the plan according to which the remainder of the plant was operating. The machine shop and the assembly departments were working to a mass production schedule, and therefore it was essential that the former should have a continuous supply of castings so that the flow of materials through the plant would not be interrupted. The best way to insure the supply was to place in the foundry a continuous pouring system. In order to get rapid melting of the iron, which was a necessity under this scheme of things, two electric furnaces were installed. Only one furnace, however, is generally used for melting gray iron, the other being utilized for melting brass.

The charge for the electric furnace is generally made up of 100 lb. of pig iron, 200 lb. of machine shop borings and 200 lb. of other scrap material, such as sprues, gates and rejected castings from its own plant. In some cases pig iron is omitted and the charge consists of iron borings, scrap iron and ferrosilicon. The heating time is about 1 hr.; the pouring of the iron and the recharging of the furnace take about ½ hr. At present about six heats a day are being run, but obviously production can be greatly increased if necessary.

Of the single-phase rocking type, the furnace, having two electrodes, operates on 100 kw. of electricity. Melting occurs in a non-oxidizing atmosphere and the poured metal shows almost the same analysis as that charged. The average pouring temperature is between 2800 and 2900 deg. Fahr., this high degree of superheat being required in order to produce the best physical properties. At this high temperature the graphitic carbon is thoroughly



Side Elevation and Floor Plan of Small Ohio Iron Foundry Where Mass Production Methods Are Employed

broken up and distributed uniformly throughout the metal, the resultant metal possessing a dense, fine, uniform grain structure of improved machinability and of superior strength.

Furnace Lined With Special Material

Instead of having the usual refractory lining, the furnace is completely lined with Champion furnace patching material. This is rammed up between the steel form and the wall of the interior of the furnace. It is essential to preheat the material to about 2800 deg. Fahr. before starting the melting operation. At that temperature it attains great mechanical strength. The first heat then increases its solidity.

Serving the electric furnace is an overhead monorail conveyor which carries the ladles to the molds nearby.

Molds Are Transported on Sprocket and Chain Power Conveyor Which Forms a Rectangle in Center of the Foundry

The molds are situated on a sprocket and chain power conveyor which forms a rectangle in the center of the foundry. The molds move along the conveyor to a point near the furnace where the molten metal is poured. The conveyor is operated by a 3-hp. motor and has three speeds.

After the castings are poured, the molds move a short distance along the conveyor to a shakeout grate, where they are lifted by an air hoist and are shaken out. At this point they are taken in a wheelbarrow outside the foundry door, where they are left to cool until the following morning.

Sand Handled as in Larger Foundries

Meanwhile the sand passes throughout the shakeout grate into a mixer where the water is added to give the proper moisture. From the mixer the sand is elevated by means of a bucket conveyor to a bin, where it is stored and cooled. Whenever needed, it then passes through a hopper into a Royer sand conditioner, where it is conditioned and thrown on a belt conveyor, which carries it to the sand bins above the molding machines. Sand is dropped into whatever bin is desired by opening the plow above the bin.

The empty flasks are moved along the conveyor to a point opposite the molders. Here they begin the cycle just described.

The molding department is equipped with Tabor, Arcade and International molding machines. The molder lifts the mold by hand from his machine to the conveyor, ready to begin the journey to the pouring floor. In the core department are International and Tabor core making machines and a drawer-type oven manufactured by the American Foundry Equipment Co.

Castings Sprayed With Paint

Each morning the castings, which have cooled overnight just outside the foundry door, are brought by hand into the foundry and are deposited on a roller conveyor, which carries them to the cleaning, rough grinding and snagging operations. They then pass through a paint spray booth, where they are given a prime coat before being machined.

In addition to the power conveyor already mentioned, the foundry has a gravity roller conveyor, on which snap flask molds are placed, poured and rolled down to the shakeout grate.

Sand Reclamation Equipment Designed by Company

While the output of the foundry is small, all work of a particular nature is segregated so that workmen do it and nothing else. For instance, the molders do nothing but make molds, the pouring of iron and reconditioning of sand being done by ordinary unskilled labor. The sand reclamation process is similar in most respects to that in operation in large foundries. It is constructed, however, on such a small scale that it does not conform to any of the standard installations offered by makers of that type of equipment. Under the circumstances it was designed, manufactured and erected by the company.

E. A. Hobart, an officer of Hobart Brothers Co., states

Castings Move on Roller Conveyor from Foundry to Cleaning, Rough Grinding and Snagging Operations

that the decision to erect a foundry was based principally on the necessity of controlling the company's source of supply of castings. Before its own foundry was put into operation, the company purchased castings from four jobbing foundries, but since its orders constituted such a minor part of the work done by these foundries, it often was seriously inconvenienced by delayed deliveries. The new arrangement, whereby it makes its own castings, enables the company to get castings when it wants them, to employ molders who are thoroughly familiar with the kind of castings required, to put through small or large orders without delay, and to get out special and experimental work whenever needed. As Mr. Hobart puts it, "The foundry provides a connecting link between the raw material, which can be stored in any desired quantity, and the machine shop, which must have a continuous supply of castings."

Although the second electric furnace sometimes is used in melting gray iron, it generally runs on brass. It is noteworthy that the same kind of molding sand (Sandusky sand) is used for brass castings as for gray iron. The two electric furnaces are the product of the Detroit Electric Furnace Co., Detroit. The foundry was designed by E. A. Hobart and was constructed by the company.

Sand Is Reclaimed and Carried to Bins Above Molding Machines. Molders lift molds by hand from machines to conveyor (in background), ready to begin journey to the pouring floor

Demand Keeps Steel Production Up

But Decline in Commodity Prices, High Money Rates and Automobile Production Peak Presage Early Curtailment in Steel Output

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

AT such times as the present, the vital questions are: Do new orders represent current requirements? Is production going into actual consumption? Some light on these questions is thrown by our index of composite demand.

Drop in Demand Leaves It Still High

INDICATED requirements of the chief steel consuming industries dropped in March, the composite demand line falling below the levels of January and February. This was due to declines in building contracts, railroad traffic, mining activity and exports, which more than offset a gain in general manufacturing and a sustained high level of automobile production. With the exception of the record months mentioned, however, the current requirements were still the highest in recent years. Moreover, the indications are that a recovery in the indicated requirements occurred in April. In that month, building contracts and freight traffic are known to have spurted, and automobile production, though gaining less than usual for the season, made a new high monthly record.

Steel production, considering the season, also made a new peace-time high in April, probably reflecting the requirements developed by the high activity of consuming industries during the first quarter. Even so, the ingot output, while a little above the March level, is probably not out of line with the composite demand curve for the same month.

We have a definite impression, however, that April has seen the high level of steel production. It is of some interest to note that there was a similar sharp increase in the adjusted steel production index in April, 1923. At that time, production continued at the high level for several months, and it may well be that, considering the season, it will hold present levels during May and June; but it seems probable that a considerable decline will occur thereafter, if not a little sooner.

While the activity in the iron and steel industry is high, it is not alone. Any excesses in production are not attributable to the steel industry, but to the automobile, machinery and other consuming industries. The decline, when it does come, must be general, and steel will not be a special sufferer.

Railroad Orders Continue Good

AS to the near future, we find the railroads continuing to show an increase in revenue, and particularly in net revenue. There was a good recovery in April freight traffic. The surplus of equipment is moderate, and prospects of a continued high level of industrial activity for several months indicate a sustained demand for steel by the carriers.

Freight car orders fell to 6983 last month, but that is the largest April business since 1924. Domestic orders for steam locomotives also declined, but were the largest for the month since 1926. Total orders, both domestic and foreign, increased and unfilled orders were larger in April, in spite of a considerable gain in shipments. The seasonal peak of equipment buying has passed, but has been in sufficient volume to insure a fair level of manufacturing activity in the equipment field for another six months.

Conditions in Particular Fields

In spite of high money rates, *building* contracts awarded picked up a bit in April, though perhaps some allowance should be made for the extra business day. High money rates continue to work against this branch of industry, and it does not seem probable that the April upturn will be sustained.

Preliminary estimates indicate that *automobile* production in April will total about 633,000 cars and trucks in the United States and Canada. While this is a new record, the average daily increase over March is relatively small and a good deal less than usual for the season. This indicates that the trend of automobile production is now downward. We continue of the opinion that a 7,000,000-car rate cannot be maintained and that a recession in the second half of the year (probably sooner) is to be expected.

General manufacturing (excluding iron and steel and automobiles) promises to hold at the recent high levels, with little change for another month or two. Sooner or later, some effect of the credit strain and the reduction of new security issues is bound to appear. Already the machine tool business appears to be rounding off.

Mining and oil activity show little net change. Drilling for oil is still quite active, but the production secured is not in proportion to wells drilled. Copper production continues to gain. Coal recovered a little in April, but production will continue at a relatively low level.

Farm purchasing power has become less favorable. The volume of farm products marketed has declined sharply and the recent drop in farm prices, notably in wheat, is a seriously unfavorable factor.

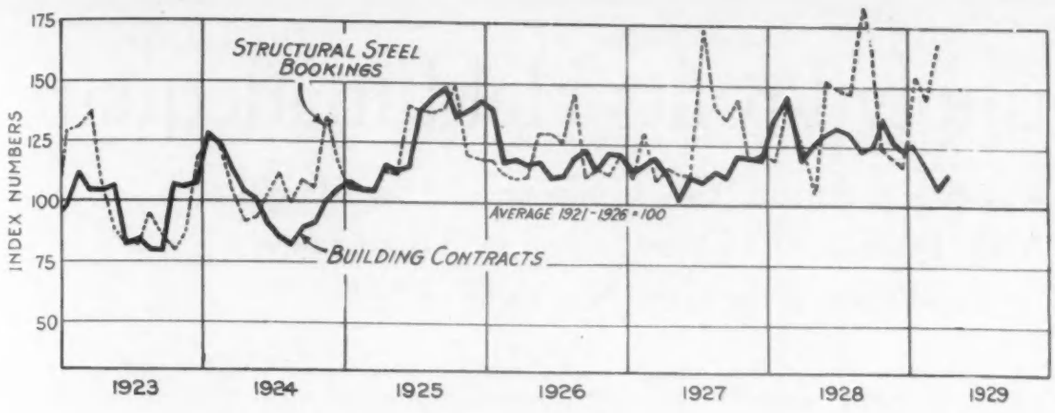
Continued absence of any considerable volume of foreign loans, the disturbance in foreign currencies and the difficulty in arranging for a readjustment of German reparations are likely to affect *exports* unfavorably.

On the whole, a gradual decline in commodity prices, high money rates, and peak levels of automobile and steel output seem to be working against a long continuance of present steel production rates, but there is nothing to indicate any early or sharp slump.

Our adjusted index of steel production shows the sharpest rise for April that has occurred since July, 1928. The average daily figure actually de-

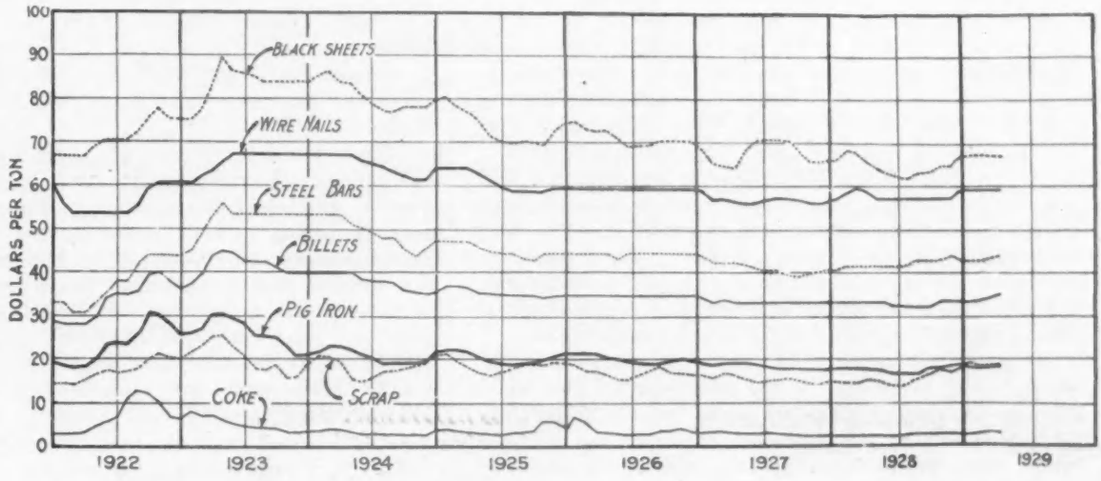
(*Concluded on page* 1397)

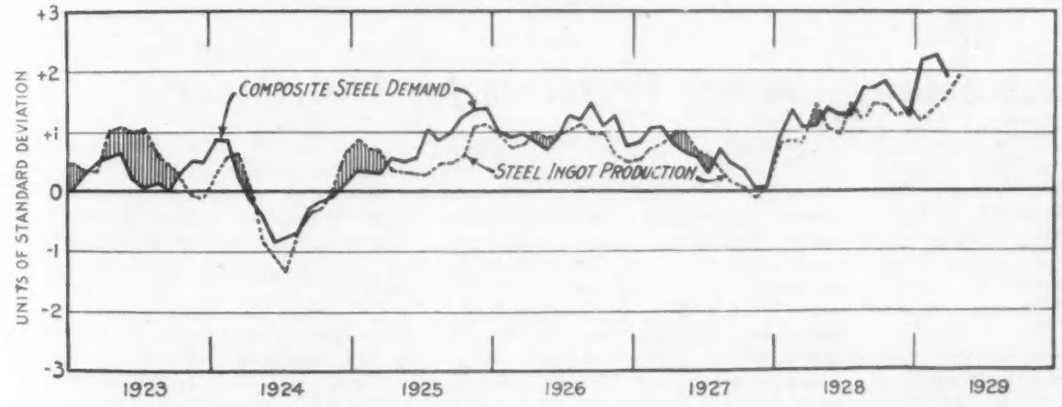
Schedule of the next instalments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows:* ***May 30****—Activity in Steel Consuming Industries;* ***June 20****—Position of Iron and Steel Producers.*



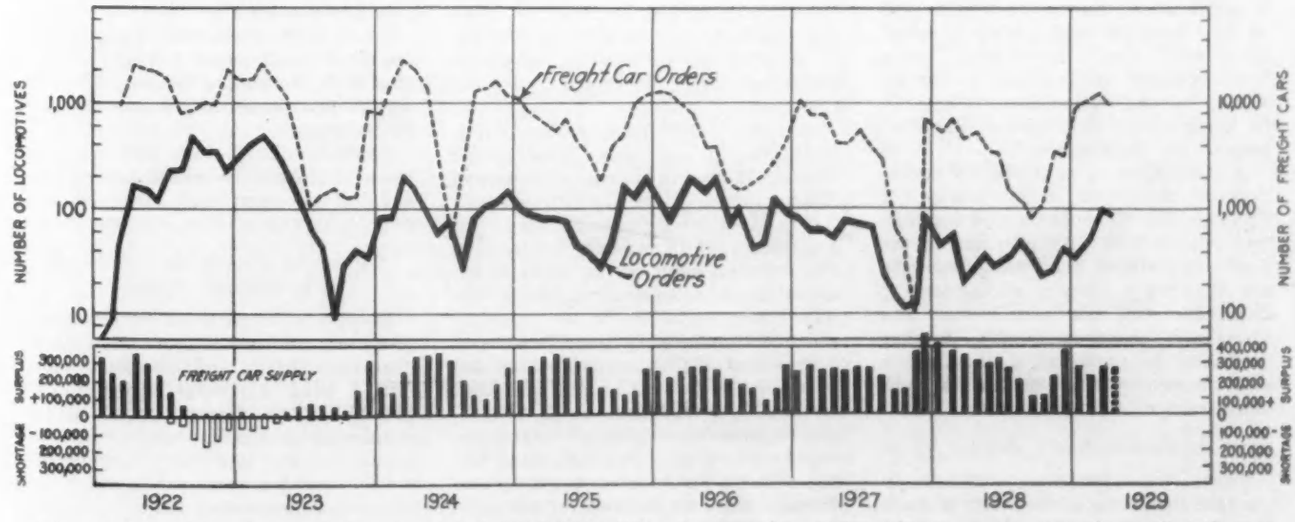
BUILDING Contracts Have Continued Far Below Structural Steel Bookings, Which Again Have Risen Sharply

EXCEPT for Steel Scrap, the Iron and Steel Price Structure Is Almost Normal. Sheets are perhaps a little low and coke is low. Scrap prices are still unduly high. Pig iron may go a bit higher before a further drop





COMPOSITE Demand, Lower in March, Is Still High. Steel ingot production (adjusted) is still upward, and shows the longest continuous high-level movement since the war



Railroad Car and Locomotive Orders Are Maintaining a Good Level. But the surplus of cars continues so large that there is no indication of immediate need for heavy purchases

Mill Supply Profits Held Inadequate

Distributers at Atlantic City Complain of Low Margin on Many Products and Direct Selling by Manufacturers —Report 2 Per Cent Net Yield on Sales

DIRECT selling by manufacturers at less than jobbers' cost prices, inadequate profits of distributers on many lines and continued high expense of distribution were uppermost in the discussions at the joint convention of the American Supply and Machinery Manufacturers' Association, the National Supply and Machinery Distributers' Association and the Southern Supply and Machinery Dealers' Association at the Ambassador Hotel, Atlantic City, N. J., last week.

At meetings of the distributers it was declared that the cost of doing a mill supply business has averaged 20 per cent of the sales during the past three or four years, and that the discounts given by many manufacturers are not sufficient to cover this cost. Notwithstanding this high cost, it was asserted that dealer distribution is the most economical for most manufacturers.

Progress was reported in some lines toward bringing about better conditions for the distributers. The maintenance of resale prices by some manufacturers has helped materially, but there are lines, it was said, in which unstable market conditions make it almost impossible for distributers to sell at a profit.

The policy of some manufacturers to sell direct to the industrial consumer at prices which are below jobbers' cost prices was repeatedly referred to as one of the most demoralizing influences in the mill supply situation.

It was stated that many mill supply houses did not make last year more than 2 per cent net profit on their sales.

There was optimism in all three associations, however, that considerable progress will be made during the coming year in eradicating some of the evils which have been disturbing to both manufacturers and distributers. Trade practice conferences to be held soon by some of the groups which make up the membership of the manufacturers' association are looked upon as a step that will bring into the limelight the practices complained of by dealers. The dealers hope to get better results within their own ranks and in conferring with manufacturers through local chapters, many of which have been organized in the past year or two. The manufacturers' association will be divided up into groups, according to products, to facilitate the conference idea.

Direct Selling Creates Problems for Distributer

INADEQUATE profits on some lines of manufactured products handled by mill supply houses and the problems created by direct selling by manufacturers at less than distributers' cost prices were the subject of lively discussion at the sessions of the National Supply and Machinery Distributers' Association.

Although it was reported that considerable improvement in conditions in the mill supply trade has been brought about during the past year or two through joint efforts of manufacturers and distributers, much work remains to be done, it was revealed by the convention discussions, to bring about a situation satisfactory to the distributers.

A resolution of appreciation to the retiring president, E. P. Welles, of Chicago, and the officers and committees who served with him during the past year stated that manufacturers are showing a greater willingness to cooperate with the distributers, and that such cooperation will further minimize the problems of distribution and strengthen the position of both manufacturer and distributer.

Some Discounts Below Selling Costs

There were frequent allusions to the fact that costs of distribution have increased to an average of 20 per cent of selling prices, a figure which the experiences of the past few years have convinced the distributers is irreducible. Yet some manufacturers, it was stated, are still allowing discounts below distribution costs. Some of these discounts were said to have remained unchanged for many years. In some lines, notably vises, chain, bolts, nuts and rivets, hack saw blades and a few others, better conditions have been brought about through cooperation between the manufacturers and distributers, and during the next year the officers and committees of the national association will work on various individual lines to work out like changes.

A recent practice of some manufacturers in soliciting business through their own representatives and turning over to the distributer such orders as they receive to be filled with a deduction of 10 per cent commission was frowned upon by the national association in a resolution, which declared such practices to be "unsound and not conducive to good business."

President Welles in his opening address to the convention declared that much of the criticism of the distributer is founded on erroneous and unsound reasoning. He said that the distributer's position has become more difficult, not only because of competitive conditions, but because buyers are demanding an entirely new type of service which has increased the problems of the distributer.

"The task of the distributer," he said, "would be lightened considerably if he were relieved of the harassing tactics pursued by some manufacturers."

The things the manufacturer could do to help the distributer were stated by Mr. Welles as follows:

1. Suggest and maintain resale prices that will provide adequate margins for the distributer.
2. Manufacturers should discontinue the practice of using so many outlets that it is impossible for any distributer to secure a satisfactory volume of business.
3. Place distribution on an equal basis through the allowance of the usual 2 per cent cash discount and pay freight to all destinations.

Survey to Determine Causes of Insufficient Profits

George A. Fernley of Philadelphia, secretary of the organization, said that the officers and executive committee held a special meeting last September to discuss what action should be taken to determine the causes for the fact that "distributers are not making a net profit which adequately compensates them." At that meeting it was decided to authorize a special survey, which has since been

conducted by Robert L. Hobart of the Wharton School of Commerce and Finance, Philadelphia. Copies of the survey have been printed in booklet form and are available for free distribution to interested persons upon application to Mr. Fernley, whose address is 505 Arch Street, Philadelphia.

An overhead expense report was also submitted to the convention. It revealed that the cost of doing business in mill supply distribution has remained constant during the past four or five years.

"Efficient and economical distribution," said Mr. Fernley, "is one of the most important problems in our industry. In order to place the products of manufacturers in the hands of industrial consumers with the least expense and greatest expeditiousness, practices which tend to disrupt the distribution facilities of the industry should be minimized or abandoned. One of the most demoralizing factors is direct competition of manufacturers, and we have therefore continued to give it our close attention.

"Our association has long maintained that the alleged economies of many so-called short cuts were fictitious, and that when manufacturers attempt to sell direct they must assume the obligations, responsibilities, services, duties and functions of the distributer, which materially inflate their costs. The truth of our contention is now conceded by merchandising experts in many fields of activity, including representatives of the Federal Government. A tremendous amount of publicity has been given the fact that distribution costs can be transferred from one agency to another but not eliminated, and, as a result, we are hopeful that as time passes the distributer will be accorded the recognition to which he is unquestionably entitled."

Changes Being Brought About in Some Products

Representatives of a number of lines of manufactured products addressed the distributers relative to progress that has been made in bringing about trade conditions more satisfactory to the distributers.

Don S. Brisbin, Columbus McKinnon Chain Co., Tonawanda, N. Y., told of the new distribution policy recently inaugurated by chain manufacturers. Under this plan, buyers are divided into three classes: Those who buy in carload lots, those who buy in standard unbroken packages, and those who buy less than standard packages. Prices on broken package lots are about 30 per cent higher than those on full packages, a differential which affords a margin for the distributer. Larger profits are allowed on some slow-moving sizes.

E. N. Beisheim, Bunting Brass & Bronze Co., Toledo, Ohio, said that distributers would make the most money by handling nationally advertised phosphor bronze and other bearing metals, particularly those advertised widely in the trade publications. He said that the volume of business in bearing metals is greater than is generally realized by distributers. Some manufacturers of these products, he said, are forced to sell direct to the user because they do not have good wholesale outlets. The discussion which followed this talk revealed that in some cities efforts have been made by the distributers themselves to obtain distributer representation for companies which have had such outlets.

New Officers of the Supply Associations

AMERICAN SUPPLY AND MACHINERY MANUFACTURERS' ASSOCIATION

President—David C. Jones, Lunkenheimer Co., Cincinnati.

First Vice-President—Frederick H. Payne, Greenfield Tap & Die Corporation, Greenfield, Mass.

Second Vice-President—W. C. Allen, Black & Decker Mfg. Co., Towson, Md.

Treasurer—George T. Bailey, Oliver Iron & Steel Co., Pittsbutgh.

Members of Executive Committee—J. Harvey Williams, J. H. Williams & Co., Buffalo, and William H. Fisher, T. B. Wood's Sons Co., Chambersburg, Pa., for three years; Edward H. Ball, Chicago Belting Co., Chicago, and Harold F. Seymour, Columbian Vise & Mfg. Co., Cleveland, for two years; H. P. Ladds, Lake Erie Bolt & Nut Works, Cleveland, and H. Z. Callender, Whitman & Barnes, Inc., Detroit, for one year.

NATIONAL SUPPLY AND MACHINERY DISTRIBUTERS' ASSOCIATION

President—H. H. Kuhn, Hardware & Supply Co., Akron, Ohio.

First Vice-President—H. E. Ruhf, Cleveland Tool & Supply Co., Cleveland.

Second Vice-President—E. B. Hunn, C. S. Mersick & Co., New Haven, Conn.

Members of Executive Committee—Percy G. Maddock, Maddock & Co., Philadelphia; A. E. Douglas, E. A. Kinsey Co., Cincinnati; T. E. Hazell, William H. Taylor & Co., Allentown, Pa.

SOUTHERN SUPPLY AND MACHINERY DEALERS' ASSOCIATION

President—D. D. Peden, Peden Iron & Steel Co., Houston, Tex.

First Vice-President—C. J. Salm, Dixie Mill Supply Co., New Orleans, La.

Second Vice-President—C. W. Beckner, W. Va.-Ky. Hardware & Supply Co., Huntington, W. Va.

Members of Executive Committee—W. W. Doe, Alabama Machinery & Supply Co., Montgomery, Ala.; W. W. Taylor, Arkansas Mill Supply Co., Pine Bluff, Ark.; W. M. Given, Young & Vann Supply Co., Birmingham; T. C. Keeling, Nashville Machine & Supply Co., Nashville, Tenn.

Work Done in Power Transmission

W. S. Hays, executive secretary, Power Transmission Association, told of the work which this association is doing to improve conditions in the industry. He spoke of the developing realization by manufacturers that the service rendered by distributers cannot be replaced economically. In recognition of the importance of industrial distributers, the Power Transmission Association has a special dealers' relations committee which will confer with similar committees of the distributers' associations to the end that conditions may constantly be improved.

"In view of the personal contacts made and the happy relationships with power users enjoyed by distributers' salesmen, it is possible through intelligent salesmanship," said Mr. Hays, "to show the plant engineer where he can make great savings in power transmission in his plant. For example, in one plant 235 tests were made upon motor-driven tools and group drives, having a total of 2100 connected motor horsepower. After the tests, reductions to 1100 hp. were made in connected motor horsepower, some of the limeshafts of the groups showing a much reduced friction load through installation of anti-friction bearings.

"In another instance, a battery of more than 300 Gleason gear shapers, where one type of belt had been installed replacing another, effected a saving of about $35 per machine, or a total of about $10,500. In another plant the simplification of the power transmission equipment reduced preventable losses from 10 to 30 per cent to a minimum of 3 or 4 per cent. Still another survey showed marked economies possible by changing belts, and more than $50,000 in sales resulted.

"If you can show a power user definite savings he will buy the equipment and supplies you recommend. If you do it often enough you increase your sales. An exhaustive survey of sales of mechanical power transmission equipment shows at least 50 per cent is sold through dealers. It is self-evident that manufacturers and distributers should work together to serve their ultimate customers."

Among the things the association is engaged in is the revision of data books and college textbooks to conform to modern practice and technical developments in mechanical drive.

Valves and Fittings Market Improved

D. W. Stockham, Stockham Pipe & Fittings Co., Birmingham, said that the valve and fittings market is in better condition than in years. Increased demand and better merchandising, he said, have brought this about. He said there is still a great difference of opinion among manufacturers as to the policy of direct selling; his own company, he added, did

New Officers of National Supply and Machinery Distributers' Association

SEATED, left to right: H. E. Ruhf, Cleveland Tool & Supply Co., Cleveland, first vice-president; H. H. Kuhn, Hardware & Supply Co., Akron, Ohio, president; E. B. Hunn, C. S. Mersick & Co., New Haven, Conn., second vice-president; George A. Fernley, Philadelphia, secretary. Top row, left to right: Arthur Yorke, Hansen & Yorke Co., New York; T. E. Hazell, William H. Taylor & Co., Allentown, Pa.; Percy G. Maddock, Maddock & Co., Philadelphia; A. E. Douglas, E. A. Kinsey Co., Cincinnati, and William T. Todd, Jr., Somers, Fitler & Todd Co., Pittsburgh, members of the executive committee

not object to direct selling if done at a price which protected the legitimate distributer. The manufacturers of valves and fittings are more and more impressed by the correctness of the principle of fair and profitable resale prices. A trade practice conference of the fittings industry is to be held this week in Pittsburgh.

Harold F. Seymour, Columbian Vise & Mfg. Co., Cleveland, said that the vise manufacturers have worked for the past two or three years toward making prices profitable for jobbers. He said that resale prices would be established which would place vises on a 25 per cent basis in most cases.

The association decided to take action toward bringing about better conditions in the marketing of twist drills. It was said that manufacturers are anxious to cooperate.

William P. Jeffries of the Hack Saw Blade Manufacturers' Association said that his group had virtually got rid of secret rebates and had largely eliminated competitive direct selling. He said also that the hack saw blade manufacturers had succeeded in reducing materially the number of sizes, and that very few calls are now received for discontinued special sizes.

Horace Armstrong, Armstrong Brothers Co., Chicago, said conditions in drop forged tools are the best since 1921. He thought that the making of six months' or yearly contracts for drop forged tools should be discouraged for the reason that such contracts tempt manufacturers to cut prices.

S. Horace Disston, Henry Disston & Sons, Inc., Philadelphia, discussed the file situation and Frederick H. Payne, Greenfield Tap & Die Corporation, Greenfield, Mass., talked on taps and dies. Mr. Payne said that the tap and die industry had been materially aided by an increase in export, which has been brought up to about 25 per cent from about 10 per cent, to which it dropped after the World War.

Local Chapters to Aid in Work

In the final session of the convention it was decided to refer some of the problems of distribution which are pressing for solution to the local chapters, which are a new feature of the association plan of organization. A good many chapters have been formed in the past year or two and efforts will be made to organize them in every large distributing center. Local problems will be handled by the local chapters, which will in turn seek the aid of the national organization and its special committees. The local chapter movement, it was said, promises to be of material aid in ironing out differences between manufacturers and distributers, many of which are local rather than national problems.

Problems of Distribution Most Disconcerting

That the problems of distribution are the most disconcerting to the average business man was the statement of H. C. Dunn, business specialist, Department of Commerce, in an address on "Analyzing Distribution Costs." Mr. Dunn said that all of the evidence the Department of Commerce has gathered on this subject seems to point clearly to the need for business statistics, research, analysis, control and scientific management.

He believed there was need for a new type of engineering—profit engineering. He would divide the functions of a profit engineer in two classifications:

1. Simplification, based on periodical surveys of the varieties, sizes and dimensions of the products manufactured or handled; on the concentration of markets by volume and cost, the same of prospects and customers.

2. Clearing house for all data pertaining to the industry and those industries providing sources of supplies and those industries consuming the product.

"In the solution of the problems of production," he said, "science has played an important part. Why shouldn't it do likewise for distribution? Science is organized knowledge. Organized knowledge implies research and analysis."

What Market Research and Analysis Have Done

Mr. Dunn then gave examples of what market research and analysis have done in a number of cases which have come to the attention of the Department of Commerce.

"A survey of the manufactures of an East Central city showed that when its 474 manufacturers were classified by size, 17 or about 3½ per cent, represented over 58 per cent of the purchasing power of the 474. Fifty-seven others represented 24 per cent of the total purchasing power,

and the remainder, 400, represented but 18 per cent altogether. Should equal sales effort be proportioned to each?

"It seems more often the rule than the exception to find that 80 per cent of the business is done on 20 per cent of the varieties offered, or that 80 per cent of the sales income comes from 20 per cent of the effort applied. This disproportionment of returns on the investment seems to hold whether the subject of the analysis be an area, an industry, a manufacturer, a wholesaler or a retailer.

"For example, the woven wire fence industry found it was making 552 sizes and types and combinations of gage of wire, length of roll, etc., and 2072 sizes of packages, of which 69 and 138 items respectively were found adequate to fill any consumer demand.

"A well-known manufacturer of self-opening and adjustable die heads analyzed his sales and found 80 per cent of his business came from 2000 sizes or varieties, and only 20 per cent from the 53,000 others his company felt it had to be prepared to furnish. Eighty per cent of his volume from 3.6 per cent of his line, only 20 per cent from the other 96.4 per cent. By concentrating his manufacturing and selling efforts on his essential lines, he reduced his inventory by $225,000, thus saving $13,500 a year in interest charges, as well as $10,000 through reduced obsolescence charges, while through the consequent reduction of clerical work he saved $12,500 in office payroll.

"A wholesale hardware merchant analyzed his inventory and found he was carrying 12,000 items. Analysis revealed that 71 per cent of the total business was done from only 62 manufacturers, while the 12,000 items represented the products of more than 700 manufacturers. Today, with an inventory reduced to 6500 items from 450 manufacturers, he finds that 60 per cent of his sales are the products of only 60 manufacturers. He analyzed his customers' accounts. He found there were 1432 customers on his books. When the volume of business done with each annually was measured against the volume determined upon as necessary to produce a satisfactory profit, he found that only one-half of the accounts came up to this measure. Approximately 700 of the accounts were unprofitable. The unprofitable accounts were dropped, shrinking his volume of sales 33 per cent and reducing the size of his sales territory also by 33 per cent. After a three-year operating period in the restricted area, with the reduced line, his dollar volume of net profits had increased 35 per cent; his cost of distribution was reduced from 20 per cent to 16 per cent of his gross sales.

"It would seem that the problem confronting distributers is to buy in such quantities and varieties as to provide a steady, even flow of merchandise to the consumer without building up unnecessary surplus stocks. It would seem that the problem of the manufacturer or the producer is to coordinate his activities to correspond. In this probably lies the approach to the solution of some of our distribution problems and to me it is one of the most important factors of modern distribution."

Manufacturers Favor Flexible Provision of Tariff Law

THE American Supply and Machinery Manufacturers' Association adopted a resolution favoring the retention in the revised tariff now under consideration by Congress of the so-called flexible provision and commended the putting of tariff making on a more scientific basis by greater utilization of the fact-finding work of the United States Tariff Commission.

The association also reiterated its belief in the wisdom of a revision of the anti-trust laws, and approved a plan to secure the support of other trade associations so that indorsements may be presented to Congress at its next regular session.

Tariff legislation was the subject of an address to the convention by James A. Emery of Washington, counsel of the National Association of Manufacturers, who said that "there exists at this time and has existed for some years the necessity for retaining and improving administrative rate adjustment machinery which would adapt the protective principle to changing economic conditions."

Mr. Emery did not propose that Congress relinquish its tariff-making authority, but that Congress should keep the flexible provision in effect, so that the President, with the aid of the Tariff Commission, may adjust tariffs from time to time, as changing conditions and differences in foreign and domestic costs of production may require.

"Congress can no more deal with a vast number of interrelated items constantly affected by economic change," he said, "than it can deal with the delicate cobweb of rate adjustment which it administers through the Interstate Commerce Commission. Moreover, experience demonstrates that it is politically impossible to open a single schedule or rate to revision without loosening the flood gates of general tariff revision.

"An administrative adjustment of the tariff is not a surrender of Congressional authority, but an assertion of it in which the President, as the agent of Congress, executes its will, with only such discretion in the use of means to attain the Congressional

New Officers of American Supply and Machinery Manufacturers' Association

David C. Jones, Lunkenheimer Co., Cincinnati, president; George T. Bailey, Oliver Iron & Steel Co., Pittsburgh, treasurer; R. Kennedy Hanson, Pittsburgh, the new secretary, who is also secretary of the National Pipe and Supplies Association

end as are necessary to effectuate its policy."

Regrets Failure of One-Association Plan

In his address to the convention as its president, Dixon C. Williams, Chicago Nipple Mfg. Co., Chicago, spoke of the disappointment of the manufacturers in the failure of the plan approved at the Nashville convention a year ago to consolidate the three mill supply associations.

"We believed then, as we believe now," said Mr. Williams, "that a grave error was committed in the rejection of the proposition. Now, as then, we stand ready to enter into the pact should the opportunity present itself."

The failure of the amalgamation plan left the manufacturers' association in a position bordering on disintegration, but a reorganization has been effected, the office of the secretary and manager has been moved from New York to Pittsburgh, which was selected because of its central location, and a new secretary-manager, R. Kennedy Hanson, was employed a few months ago and is now actively engaged in the work. Mr. Hanson is also secretary of the National Pipe and Supplies Association.

Talk on Trade Practice Conferences

The convention of the American Supply and Machinery Association was opened with a joint session, at which members of the National and Southern distributers' organizations were present. After short talks by the presidents of the three associations, the mill supply men heard a talk on trade practice conferences, as instituted by the Federal Trade Commission, delivered by M. Markham Flannery, director of such conferences for the commission. Considerable interest attached to this discussion because of the expectation that a number of the groups of manufacturers comprising the membership of the American association will soon engage in such conferences.

"A trade practice conference," said Mr. Flannery, "is not a panacea for all the ills of business; but if a bona fide desire exists in the industry to better conditions, and, if the conference is properly prepared, it affords opportunity for frank and free discussion of its difficulties. An industry receives at least the tentative opinion of the commission on resolutions passed, which, if accepted, are regarded as rules of business conduct for the entire industry on the subjects covered. It is the most efficient method yet devised for self-government of business."

A reorganization plan for the association of manufacturers includes the separation of members into groups, according to the products manufactured. It is believed that more effective work can be done in this manner, particularly in meeting with distributers for the ironing out of distribution problems.

T. C. Keeling, Nashville Machine & Supply Co., Nashville, Tenn., told the manufacturers that mill supply distributers did not average 2 per cent net profit on their sales last year and that the problems of distribution have got beyond the control of the distributers. The help of the manufacturers was urged. Mr. Keeling said that some discounts had not been changed in 30 years, remaining at 12 or 15 per cent, which in the old days may have been very good, but which, he said, are inadequate for present costs of doing business. Despite the high costs of warehouse distribution, the mill supply houses can distribute for the manufacturer more economically than he can do it for himself, Mr. Keeling added.

To Educate Dealers' Salesmen

A committee on education of dealers' salesmen is to be organized by the manufacturers' association. This action was taken following a discussion by David C. Jones, Lunkenheimer Co., Cincinnati, who told of the methods which have successfully been employed by his company. Three or four times a year groups of dealers' salesmen are invited to Cincinnati for a stay of three or four days, during which time they are shown through the plant, given lectures on the products and otherwise instructed in the products and sales arguments of the company. Mr. Jones said that the plan had greatly increased the sales by some distributers, who before attending these meetings had not done much with the line.

Volume Large, Profits Inadequate, Say Southern Dealers

THE Southern Supply and Machinery Dealers' Association devoted most of the time at its sessions to discussions of trade conditions and of various ways to better merchandising methods in the distribution of mill supplies.

In his report as secretary, Alvin M. Smith, Smith-Courtney Co., Richmond, Va., said that "relations with our manufacturing friends during the past year have been cordial in the extreme, and, while there still remain a number of manufacturers to whom we have not found it possible to 'sell' complete dealer distribution, we believe the number that see it our way is increasing each year."

During the past year, Mr. Smith said, the association, working mainly through committees, has been building up closer contacts with the manufacturers "in an honest effort to establish manufacturer-dealer distribution, which, from our viewpoint, is the logical method of bringing to the industrial consumer the products of the manufacturer."

"Our efforts sometimes meet with discouragement," said Mr. Smith, "but, on the whole, we have made gains. Sometimes a manufacturer whom we have succeeded in committing to a policy of dealer distribution also becomes discouraged. Recently one large manufacturer whom we had convinced said that his readiness to work with us had not met with entire success, possibly through some failure on his part to give complete cooperation or possibly because of our failure to give complete cooperation.

Declares Dealer Distribution Most Economical

"We are fully convinced that dealer distribution is the most economical method for the manufacturer, and this is borne out by the selling policies now in vogue among a large number of reputable manufacturers who distribute their products entirely through the dealer.

"The evils from which we suffer are due largely to the actions of those dealers who constantly break down established prices and prevent themselves and others from making the fair profits to which they are entitled."

Mr. Smith believed that meetings of distributers for discussions of their common problems would help to overcome this "business selfishness." He advocated standardization of terms and business practices, and said that much would be accomplished toward improving conditions if dealers, as well as manufacturers, would educate themselves to think of profit instead of volume.

In this connection he spoke of the interest which members of the associations have in trade practice conferences that have been held or will be held under the auspices of the Federal Trade Commission. While commending self-regulation in each industry, he doubted whether the aid of the Government would make better business men of people in industry. However, he said that his association would watch closely the results of the trade practice conference shortly to be held by the bolt, nut and rivet industry, and he commended the work of Charles J. Graham, who has led the work of stabilizing the bolt and nut trade and other lines. Mr. Smith said that the new situation in bolts, nuts and rivets had reacted favorably on the distributers.

The Southern dealers are cooperating with the National Pipe and Supplies' Association in assembling facts and figures regarding the distribution of wrought pipe. In some sections of the South, it was stated, dealers are obtaining an adequate profit on pipe, as well as on standard fittings and valves, but in others a loss is shown.

Among the recommendations made

New Officers of Southern Supply and Machinery Dealers' Association

SEATED, left to right: Alvin M. Smith, Smith-Courtney Co., Richmond, Va., secretary; C. W. Beckner, W. Va.-Ky. Hardware & Supply Co., Huntington, W. Va., second vice-president; D. D. Peden, Peden Iron & Steel Co., Houston, Tex., president; C. J. Salm, Dixie Mill Supply Co., New Orleans, La., first vice-president. Top row, left to right: W. M. Given, Young & Vann Supply Co., Birmingham; T. C. Keeling, Nashville Machine & Supply Co., Nashville, Tenn., and W. W. Doe, Alabama Machinery & Supply Co., Montgomery, Ala., members of executive committee.

by Mr. Smith for further improvement in conditions in the mill supply trade were these:

Build up manufacture-dealer distribution.

Break down the practice of price cutting and violation of resale prices and establish a stable market.

Build up a strong selling plan based on proper resale prices.

Seek to eliminate secret rebates and special allowances, which too often are passed on, thus breaking down the price structure.

Standardize terms of sale and cash discounts.

Standardize the manner of handling returned goods.

Conduct research in overhead cost so that dealers may arrive at proper and scientific selling prices.

Conduct a national advertising campaign on the advantages of dealer distribution.

Build up a service and quality sales plan.

Eliminate price guarantees.

Give selling prices and not cost prices to salesmen.

Discourage commercial bribery and excessive entertainment, which can readily be carried to the point of purchasing business.

It was reported that the cost of doing business in 1928 among members of the Southern association was 21.92 per cent with interest and 18.97 per cent without interest. Replies were received from only a fraction of the 137 members.

The association decided to hold its 1930 convention in New Orleans, and invitations were extended to the American Supply and Machinery Manufacturers' Association and the National Supply and Machinery Distributers' Association to meet there at the same time.

D. D. Peden of the Peden Iron & Steel Co., Houston, Tex., was elected president, succeeding W. W. Doe of the Alabama Machinery & Supply Co., Montgomery, Ala.

Emphasizes Importance of Quenching Practice

Quenching is the most important part of the treatment of tool steel, in the opinion of Frank R. Palmer, assistant to president, Carpenter Steel Co., Reading, Pa., given at a meeting of the Boston chapter, American Society for Steel Treating, held May 10. Rapid cooling sets up internal stresses in metal, and these should be reduced to the minimum. Simple experiments showed the amount of load necessary to cause the changes in shape due to quenching. Steel bars and rings of various cross-sections were quenched in various ways to illustrate the methods which balance the internal stresses and cause the least change in shape. Mr. Palmer looks forward to the day when the supervisor will use the slide rule, as well as the pyrometer, to plan a heat treatment schedule.

Dr. R. S. Williams, Massachusetts Institute of Technology, Cambridge, Mass., was elected chairman of the chapter for next year, and H. E. Handy, Saco-Lowell Shops, Biddeford, Me., secretary-treasurer.

A Second Warrior River Towboat Completed

The Clairton plant of the Carnegie Steel Co. has completed the second of two large Diesel-electric drive towboats for the Tennessee Coal, Iron & Railroad Co. The new boat, Alabama, completed her load trials April 25 and started down the river the next day for her home port.

Operating a barge line transporting steel products between Birmingport and Mobile, Ala., the owners chose this form of propulsion to effect economies in operating costs and to secure maximum maneuverability for negotiating the narrow and tortuous Warrior River. The Warrior, a sister ship of the Alabama, and the first of this class of river towboat to use this type of drive, has been in service only a few weeks, but has already demonstrated the facility with which she can handle a large tow in the shallow and swift currents encountered, it is reported.

Both vessels are of the tunnel stern, twin-screw type, with four rudders. The boat may be maneuvered directly from the pilot house, thus eliminating all delay or confusion of signals.

Each screw is direct-connected with an electric motor of 400 hp., which takes power from a generator driven by a Diesel engine. The engines operate at constant speed; changes in propeller speed are accomplished by varying the voltage through changes in the generator excitation. The engines on both vessels were made by the New London Ship & Engine Co., Groton, Conn., and the electrical equipment by the General Electric Co.

Aluminum Alloys Now Being Plated with Chromium

A new use for chromium plating has recently been developed. Aluminum alloys, both as castings and as rolled material, are being used quite extensively in airplanes, in furniture, and some other products, and it has been found that these can be advantageously plated with chromium. The practice is being carried out on quite an extensive scale, giving the aluminum products a much brighter appearance, making them harder and less subject to marring.

Fan Used in Electric Air Drawing Oven

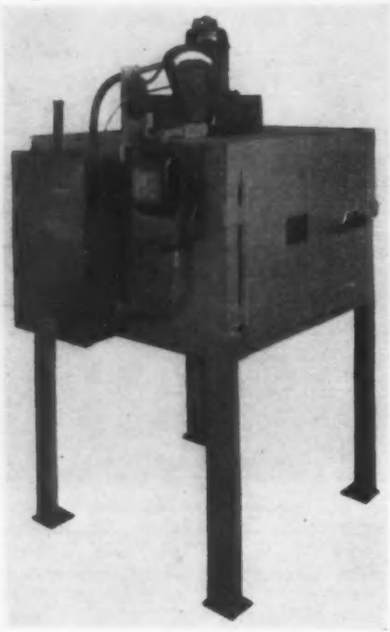
THE General Electric Co. announces a new air drawing oven, Type AD, for drawing carbon steel at temperatures up to 750 deg. Fahr. The fan is used to agitate the air around the work, thus to improve quality and production.

Temperatures up to 750 deg. Fahr. can be obtained, thus to cover the full range of temperatures required for drawing and bluing carbon steel. Only 0.9 kw. is required, it is stated, to maintain a temperature of 500 deg. Fahr. in the oven. If the oven is in daily use, 25 min. suffices to reach a temperature of 500 deg. Fahr. in the morning, but by installing a time switch, the oven may be brought up automatically to temperature before the operators arrive, and likewise it can be cut off automatically at closing time.

The fan is located in the heating chamber and is driven by a vertical motor mounted on top of the oven. One sheath-wire heating unit is located at the top of the heating chamber, and a second is placed just under the hearth.

Temperature control is automatic. The controller can be set at any point up to 750 deg. Fahr. for holding the temperature within a margin of 5 deg. The heat-sensitive device in the oven chamber governs the operation of the controller.

The width of the oven chamber is 24 in., the depth is 21 in., and the height is 9 in. The outside overall width is 40 in., the outside overall height is 61 in., and the outside overall length is 33½ in. The door opening is 12 x 24 in. The hearth is 31 in. above the floor. The normal rating of the oven is 5 kw. and its capacity is 100 lb. of steel per hour to 500 deg. Fahr.



Drawing Oven for Carbon Steels, Using Electric Heat and a Fan

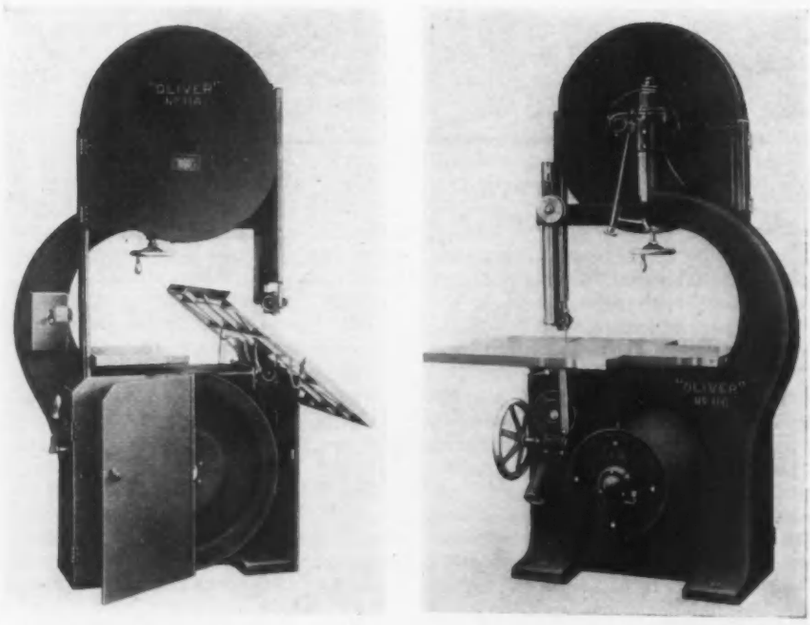
High-Speed Band Saw with Built-In Motor

INCLOSED motor-on-shaft unit drive and demountable disk wheels are features of a new band sawing machine built by the Oliver Machinery Co., Grand Rapids, Mich., for operation at 750, 900 and higher r.p.m. The machine, adapted for pattern shop use, has capacity of 22 in. under the guide, which permits cutting high patterns. The swing between saw and column is 36 in. The table measures 36 x 36 in. and is arranged to tilt 45 deg. to the right and 7 deg. to the left. It has a ground top to facilitate pushing the work past the saw. Saw blades from 18 ft. 4 in. to 19 ft. 6 in. long, and up to 2 in. wide may be used.

The driving motor, of 3 to 5 hp., according to the service, is built-in directly on the lower wheel shaft, forming a single unit that is mounted in the finished round opening in the column. With this arrangement, the drive is both compact and accessible. Control of the motor is by magnetic starter and push button. The upper and lower disk wheels are steel clad and have demountable aluminum rims that are faced with live rubber. They are unusually light in weight. The rims are provided with dovetail grooves, and may be removed and replaced conveniently for resurfacing with rubber.

Wheel shafts are of special steel and are ground. Both the 1⅝-in. diameter upper shaft and the 2½-in. lower shaft are mounted in ball bearings. An externally contracting band brake around a brake wheel that is part of the lower wheel hub serves to stop the wheels quickly for changing saw blades. The guides are of ball-bearing roller type, one above and one below the table. Complete safeguarding of all moving parts is a feature of the machine, the upper and lower wheels being completely inclosed in sheet steel housing. The upper wheel housing has a hinged door to permit access to the wheel, and the lower wheel housing has a two-piece door at the front, as shown.

Floor space of 30 x 50 in. is occupied by the machine, which is designated as the No. 116. The weight of saw illustrated is 2500 lb., crated.



The Front View Shows the Folding Door, Tilting Table Arrangement and the Brake Lever for Stopping the Wheels After the Power Is Shut Off. The mounting of the motor in the base may be seen from the rear view, at the right

Wagner Electric Develops Ultra-Quiet Motor

THE Wagner Electric Corporation, St. Louis, has placed on the market a new electric motor, developed especially for use where ultra-quiet performance is essential. The motor proper is insulated from the supporting cradle-shaped base by means of rubber bushings. It is claimed that the use of rubber absorbs whatever vibration there may be in the running of the motor without affecting rigidity or shaft alinement. The motor is of the brush-lifting type, the brushes being lifted off the commutator as soon as rotor attains operating speed. The motor proper, it is stated, has undergone other alterations to effect quietness of operation. In addition to equipping governor weights with rubber bumpers, as was done previously, the rocker arm has been redesigned to eliminate as much as possible the brush noise during starting and stopping.

Economic Balance Essential to Prosperity

Most Pressing Present Problem Is to Find Way to Maintain Equilibrium, Says Report on Economic Changes

TO keep our complex and intricate economic machine producing continuously it must be maintained in balance, says the report of the Committee on Recent Economic Changes of the President's Conference on Unemployment. The survey is the third to be made following the President's conference on unemployment in 1921. The first was the study of Business Cycles and Unemployment, made in 1922-23 for a committee of the unemployment conference. The second, made for another committee of the conference in 1923-24, was a survey of Seasonal Operation in the Construction Industries. Herbert Hoover, then Secretary of Commerce, was chairman of the Committee on Recent Economic Changes.

Economic changes from 1922 to 1929 were not of a fundamental character, according to the report, but rather represented a speeding up and broadening of factors previously extant. Relatively stable prices, increasing purchasing power, a larger volume and an accelerated turnover of credit, and a sharp gain in the use of power (increasing three and three-quarters times faster than the growth of population) were named as prime influences contributing to a marked increase in production and a rise in the standard of living.

Throughout this period an unusual degree of balance has been maintained between consumption and production, as evidenced by rising wages without marked increases in unemployment in a period of the "broadest technological advancement which we have yet known."

"To maintain the dynamic equilibrium of recent years is, indeed, a problem of leadership which more and more demands deliberate public attention and control," says the report. "Research and study, the orderly classification of knowledge, joined to increasing skill, well may make complete control of the economic system a possibility. The problems are many and difficult, but the degree of progress in recent years inspires us with high hopes. . . .

"Once an intermittent starting and stopping of production-consumption was characteristic of the economic situation. . . . With greater knowledge of consuming habits, with more accurate records of the goods consumed, a sensitive contact has been established between the factors of production and consumption which were so often out of balance.

"Where pools of goods once were accumulated by the manufacturer, the wholesaler, the jobber and the retailer; where high inventories once meant distress, shutdowns, failures and unemployment whenever the demand subsided, there is now a more even flow from producer to consumer.

"Increasing skill and scientific data have made the anticipation of demand far more accurate, and by accurate anticipation the deliberate balance between production and consumption has, in a measure, been maintained. By advertising and other promotional devices, by scientific fact finding, by a carefully predeveloped consumption, a measurable pull on production has been created which releases capital otherwise tied up in immobile goods and furthers the organic balance of economic forces. In many cases the rate of production-consumption seems to be fairly well under control.

"To maintain this balance, and to extend it into fields which are not now in balance with the more prosperous elements of the nation, is clearly an important problem of leadership. With certain natural resources still wastefully exploited, with great industries, such as agriculture and coal mining, still below the general level of prosperity, with certain regions retarded, there remains much to do. To bring these more fully into the stream of successful economic forces is a problem of the first order."

Commenting on the equilibrium of the past few years the report states: "We have not wasted the hours of labor by strikes or lockouts. Until recently we have not diverted savings from productive business to speculation."

It is essential, it is stated, to develop a technique of balance. "Our effort has been to set up an orderly plan by which the facts (of the survey) may be articulated and against which later and better information may be more accurately judged. . . . Through incessant observation and adjustment of our economy we can learn to maintain the economic balance."

Specific recommendations of the report include the inclusion in the next census of statistics regarding the recent shift of workers to service occupations; a census of distribution; more complete data regarding unemployment and employment, extended to major fields of activity not now covered. Wage and earning statistics, it is stated, should include, in addition to averages, a classification of the workers according to amounts received and hours worked.

Shipments of Sheet-Metal Ware Are Heavier

WASHINGTON, May 14.—March shipments of galvanized sheet-metal ware, as reported by 15 concerns comprising a large proportion of the industry, were 261,065 dozens, valued at $920,567, as compared with 214,142 dozens, valued at $799,729, in February, according to the Department of Commerce. March shipments of enameled sheet-metal ware, as reported by 18 manufacturers comprising approximately 80 per cent of the industry, were 449,425 dozens, valued at $1,513,040, as compared with 390,577 dozens, valued at $1,402,858, in February.

Steel Furniture Orders Less in March

WASHINGTON, May 14.—March orders for steel furniture in the "business group" were valued at $2,883,716, against $3,060,290 in February, according to the Department of Commerce. Shipments were valued at $2,923,363, compared with $3,242,581, and unfilled orders were valued at $2,343,888, against $2,408,258. For the first three months of 1929 orders for business furniture were valued at $9,836,657, compared with $9,827,355 for the corresponding period of last year.

Orders for shelving furniture in March were valued at $1,145,623, against $919,557 in February, and shipments were valued at $1,109,876 and $974,305 respectively. Unfilled orders at the end of March were valued at $801,643, compared with $765,541 at the end of February. Orders for shelving furniture during the first quarter were valued at $3,164,764, against $2,351,156 for the corresponding period of 1928.

April British Iron and Steel Output Large

LONDON, ENGLAND, May 13 (*By Cable*).—April pig iron output was 611,300 gross tons and that of steel ingots and castings was 808,600 tons.

April output, compared with that of January, February and March and with the monthly average for 1928 and other years, is as follows, in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—January	563,900	761,600
1929—February	519,600	782,900
1929—March	590,500	859,900
1929—April	611,300	808,600

The monthly average output of pig iron for the first four months of this year has been 571,400 tons, exceeding the monthly average of 1928 of 550,900 tons. Steel output for the first four months of this year has averaged 802,000 tons, compared with 710,400 tons per month last year. It is the highest monthly rate since the war.

Changes in New Metal Schedule Limited

Only 18 Per Cent of Rates Proposed Represent Revisions— Way Left Open for New Valuation Basis

WASHINGTON, May 14.—The relatively few rate changes made in the metal schedule of the tariff revision bill, together with the reclassifications and broadened phraseology, are in line with the original indications as to what would be done. With few exceptions the revised rates are increases and are intended to compensate for altered competitive conditions. Reclassifications take into account new or comparatively new products, giving particular attention to alloys, and, with new phraseology, also are intended to clarify the law as it relates to products that have been the subject of litigation and have been classified by Treasury decisions which, majority members of the House Ways and Means Committee feel, were not in accord with the intent of the existing law. Some products are named specifically for the first time to meet this situation.

The present metal schedule carries nearly 300 rates. About 40 new rates have been added in the bill. Of the rates in the bill, approximately 18 per cent represent changes. These are upward except in limited instances such as those relating to watches, which, due to the new system of adjusting rates, have been given decreased duties.

One of the most important changes made in the metal schedule was in the basket clause, paragraph 398 in the bill. On base metal products the duty was increased to 50 per cent from 40 per cent, while on articles in part of precious metals the rate was raised to 65 per cent from 60 per cent. These changes were explained as having been made because of severe competitive conditions affecting 25 or 30 articles. The new phraseology in the machinery paragraph stipulates that all parts of machinery are made dutiable at the same rates as the machines themselves. The provision is confined to parts in chief value of metals, the duty being 30 per cent. This paragraph was rewritten to clear up the intention of the existing law, which had been so construed that articles which are not in chief value of metals and which were supplies rather than parts of machines were being imported at low rates. Examples of this nature included such items as print rollers, embossing rollers, mica condenser plates, Fourdrinier wires for paper-making machines, etc.

Bracket for 1c. Steel Retained

In broadening the schedule to include specific articles not previously mentioned the purpose was said to be to give comprehensive tariff treatment to the products affected. To a large extent they are made up of the alloys, thus giving definite recognition to the development of this industry. There are, however, other instances, such as concrete reinforcement bars, which were classified by name in paragraph 304, covering the general steel paragraph, taking duties ranging from ⅛c. per lb. up. The bulk of this imported tonnage will fall into the 1c. to 1½c.-lb. value bracket, which takes a duty of 3/10c. per lb. This covers the contention of domestic producers in protesting against the Treasury decision placing reinforcing bars in the structural paragraph with a duty of ⅛c. per lb. The new classification actually carries an increase of 50 per cent in the duty on most of such steel, assuming that the majority of foreign shipments fall within the bracket indicated.

The contention of the American Iron and Steel Institute that the first bracket of 1c. per lb. up on steel should be abolished was, however, defeated. The argument was made by the domestic industry that there is no such a thing as 1c. rolled steel. It can also be added that on the whole but few of the requests of the domestic industry were heeded, although the matter of changed valuation in part meets efforts to overcome undervaluations of imported material.

Sponge Iron Given Same Duty as Muck Bar

Sponge iron is mentioned in the bill for the first time and is placed in paragraph 303, being given the same rates of duty as those applying to muck bar.

Paragraph 305 applies definitely to stated paragraphs covering alloys, in order to facilitate administration. The dutiable limits on the alloy metals contained in steel are reduced to conform to present-day metallurgical practice. Compensatory rates on vanadium and chromium were included, $1 per lb. being provided for the former and 4c. per lb. for the latter. This paragraph also is made to apply to iron, as well as steel, so as to be adjusted to metallurgical developments, particularly in the field of stainless iron.

Increase on High-Grade Wire Rods

In paragraph 315 the rate on wire rods valued at more than 4c. per lb. was changed to 20 per cent ad valorem from 6/10c. per lb. The change reflects an increase, the purpose being to bring rates on this high-priced product to approximately the same level as rates on ordinary steel. The equivalent ad valorem rate in the existing act on this class of wire rods is about 11 per cent, while rates throughout the iron and steel paragraphs run 20 per cent or more on the average.

The twist drill paragraph (398) has been broadened to include other cutting tools, among them tools made of substitutes for tool steel. Products of the electrical industry, formerly dutiable partly at 30 per cent as machinery and partly at 40 per cent as manufactures of metal not specially provided for, are given a separate paragraph (353) and made dutiable at 40 per cent.

Fluorspar Duty $8.40 a Gross Ton

In paragraph 374, covering aluminum alloys, the phraseology was changed to avoid conflict with paragraph 302, covering ferroalloys, and the same is true with respect to paragraph 390, covering nickel. The first paragraph of the schedule (301) was given new phraseology, to avoid conflict, by providing compensatory duties on alloy scrap over the ordinary scrap rate of 75c. per ton. Under a Treasury decision alloy scrap was held to be dutiable at the rate of 75c. The proclaimed rate of $8.40 per gross ton on fluorspar was put in the bill. Rates on magnesite and palm oil were left unchanged.

Bill Opens Way to New Valuation Basis

Administratively, the bill provides some rather sweeping changes. The proposed reorganization of the Tariff Commission evidently is in line with the suggestion made by the President in message to the Congress. The bill gives the President wide power as to appointments, the political affiliation of appointees not being an element in their selection. Present commissioners could be removed from office at his will. The President would name the chairman and the vice-chairman. Wide powers of investigation would be given the commission, a means of broadening the flexible provision. Instead of basing recommended changes in rates under that provision on the difference in costs at home and abroad, the bill would permit the commission to adopt the American selling price of comparable articles as a basis for proposed rate changes to be proclaimed by the President. This changed plan evidently is intended to speed up investigations by the commission.

Changes in Rates in New Tariff Bill Compared with Rates Under Acts of 1922 and 1913

Bill Paragraph	Commodity	Unit	Proposed Rate	Existing Rate	Underwood
301	Pig iron	Gross ton	$1.125	$1.125[1]	Free
301	Iron and steel scrap[3]	Per lb. contained vanadium in excess of 1/10 per cent	1.00[2]	...	...
301	Iron and steel scrap[3]	Per lb. contained tungsten in excess of 2/10 per cent	.72[2]	...	...
301	Iron and steel scrap[3]	Per lb. contained molybdenum in excess of 2/10 per cent	.65[2]	...	...
301	Iron and steel scrap[3]	Per lb. contained chromium in excess of 2/10 per cent	.04[2]	...	...
302	Tungsten ore or concentrates	Per lb. contained tungsten	.50	.45	Free
303	Granular or sponge iron	Lb.	At existing stepped rates (about 25 per cent)	Not mentioned	Not mentioned
304	Hollow bars and hollow drill steel	Lb.	3c.[5]	1.7c.[5]	Not mentioned
	Concrete reinforcement bars	Lb.	3/10c.[5]	1/5c. (paragraph 312)	Not mentioned
305	Vanadium steel or iron	.....	8 per cent plus $1 per lb. contained vanadium in excess of 1/10 per cent	8 per cent — no additional cumulative specific duty for vanadium	All alloy steel—15 per cent ad valorem
House Bill[4]	Tungsten steel or iron	.....	8 per cent plus 72c. per lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. per lb. contained tungsten in excess of 6/10 per cent	All alloy steel—15 per cent ad valorem
	Molybdenum steel or iron	.....	8 per cent plus 65c. per lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. per lb. contained molybdenum in excess of 6/10 per cent	All alloy steel—15 per cent ad valorem
	Chromium steel or iron	.....	8 per cent plus 4c. per lb. contained chromium in excess of 2/10 per cent	8 per cent — no additional cumulative specific duty for chromium	All alloy steel—15 per cent ad valorem
315	Wire rods valued at over 4c. lb.	.....	20 per cent	6/10c. lb.	10 per cent
316	Wire rope	.....	40 per cent	35 per cent	30 per cent
318	Woven wire cloth—				
	30 to 90 mesh	.....	40 per cent	35 per cent	20 per cent
	Finer than 90 mesh	.....	50 per cent	45 per cent	20 per cent
318	Fourdrinier wires	.....	55 per cent	.....	.....
325	Anvils, over 5c. lb.	.....	3c. lb.	1⅝c. lb.	15 per cent
327	Cast iron pipe	.....	30 per cent	20 per cent	10 per cent
329	Transmission chains of not more than 2-in. pitch	.....	40 per cent	35 per cent	25 per cent
331	Upholstery nails, chair glides and thumb tacks	.....	3c. lb.	1½c. lb.	.....
343	Spring beard and crochet needles	.....	$1.50 per 1000 plus 50 per cent	$1.15 per 1000 plus 40 per cent	20 per cent
343	Latch needles	.....	$2.00 per 1000 plus 60 per cent	$2 per 1000 plus 50 per cent	.....
343	Tape, knitting and all other needles, not specified	.....	50 per cent	45 per cent	.....
344	Alloy steel cylindrical rolls	.....	40 per cent	25 plus 8 per cent	.....
351	Pens, carbon steel	Gross	15c.	12c.	8c.
351	Pens, other metal	Gross	18c.	12c.	8c.
351	Pens, nib and barrel in one piece	Gross	20c.	15c.	12c.
353	Elec'l mach'ry and apparatus—new paragraph	.....	40 per cent	Par. 399—40 per cent Par. 372—30 per cent	Paragraph 167—20 per cent
342	Umbrella and parasol ribs and stretchers, etc.	.....	60 per cent	50 per cent	.....
358	Blades for safety razors, in strips	.....	½c. each plus 30 per cent	1c. each plus 30 per cent	.....
359	Surgical instruments	.....	70 per cent	45 per cent	20 per cent
359	Dental instruments	.....	60 per cent	35 per cent	20 per cent

[1] Rate proclaimed by President under section 315 incorporated.
[2] Base rate of 75c. per ton unchanged from Act of 1922.
[3] Other commodities in paragraph 301 are also subject to duties for alloy content as specified.
[4] Additional duties for alloy content—alloy steel or iron is subject to primary rates of duty in paragraphs designated by number.
[5] Approximate.
[6] Transferred from paragraph 399 at 60 per cent to paragraph 339 at 40 per cent by courts.

Scrap Dealers and Consumers Confer

Preliminary Meeting Held in Washington to Discuss Action to Be Taken in Trade Practice Agreement

FIFTEEN of the leading consumers of scrap and 22 of the largest scrap iron firms in the country were represented at a meeting May 13, of the trade relations committee of the Institute of Scrap Iron and Steel, Inc., called by the Federal Trade Commission, at the Wardman Park Hotel in Washington. The consumers represented at the meeting expressed their approval of the type of resolutions prepared by the trade relations committee for the elimination of unfair practices. It is expected that as a result of the Washington conference, which was the first time that consumers have officially met with the scrap dealers, there will develop a machinery of cooperation between consumers and the institute for the mutual benefit of both.

M. M. Flannery of the Federal Trade Commission, who presided at the meeting, congratulated those present for their cooperation and offered the services of the Federal Trade Commission in assisting the institute in putting teeth into the resolutions that were discussed at this meeting, and that will be proposed at a conference of the scrap iron industry in Pittsburgh on May 23.

Scrap Industry Will Discipline Violators of Fair Practice

Benjamin Schwartz, director general of the institute, stated that the group that ultimately pays for unfair or uneconomic practices in the scrap iron industry are the consumers, who should welcome an opportunity to cooperate with the institute, which represents over 90 per cent of the tonnage shipped by dealers. Mr. Schwartz also made it clear that the time had come for consumers to shift their disciplinary or penalizing power, so far as scrap is concerned, to the scrap iron industry itself. He said further:

"The scrap iron industry has had a prolonged period of profitless prosperity, a condition which should concern the steel industry as well, for the weakness of any important link in the economic structure of the steel industry will inevitably be reflected in the returns of the other branches.

"There are two groups of causes that have reduced profits in the scrap iron industry. One group may be put under the heading of internal conditions, over which the scrap iron dealers may have some degree of control. It is inevitable in a disorganized industry, where the law of the jungle has prevailed heretofore, that unfair and uneconomic practices grow up, particularly under the stress and strain of high production. It is in this connection that the advice and cooperation of the consumers are welcomed, for ultimately the cost of disorganization and chaos must be borne by the consumer. It may be expected that through the educational program of the Institute of Scrap Iron and Steel many of these internal conditions which have spelled losses will eventually be eliminated.

"The other causes for losses in the scrap iron industry may be grouped under the heading of 'lack of mutuality.' By this I mean the ability of one party to a contract to exercise complete, exclusive control over the commodity, without the other party to the transaction having even an advisory opinion. The contract governing the sale of scrap; the specifications, inspection and suspension rights are some evidence of the lack of mutuality.

"These external causes are beyond the control of the scrap iron dealers. It is hoped, however, that through the institute a basis for confidence and discussion will result, which will restore some of that mutuality without which any business relationship cannot be profitable to both parties.

"The time has come for consumers of scrap to shift their burden in penalizing shippers of scrap in an effort to educate the trade. An industrial consciousness has finally been awakened in the scrap iron dealers and a sense of responsibility has been instilled through the Institute of Scrap Iron and Steel. If there is any educational work or disciplining to be done, it should be left to the industry itself. This power, exercised outside of the scrap iron industry, has been and may still be subject to abuse. It is my contention that if an organization like the institute had been functioning in years past many of the problems which now face us would not have occured."

Steel Mills Represented at Conference

Among the consumers represented at the conference were the following: Alan Wood Iron & Steel Co., Midvale Co., Phoenix Iron Co., Central Iron & Steel Co., Lukens Steel Co., Youngstown Sheet & Tube Co., American Rolling Mill Co., Weirton Steel Co., Republic Iron & Steel Co., Wheeling Steel Corporation, American Tube & Stamping Co., National Malleable Steel Castings Co., Sweet's Steel Co., Central Alloy Steel Corporation, and Keystone Steel & Wire Co.

Among the scrap iron firms present were: Luria Brothers & Co., Henry A. Hitner's Sons Co., Schiavone & Bonono Corporation, Henry Potts & Co., Charles Dreifus Co., Perry, Buxton, Doane Co., M. Bock & Son, Pennsylvania Wood & Iron Co., Briggs & Turivas, Joseph Schonthal Co., Rotter-Speer Co., Bishop & Co., Mayer Pollock, Continental Iron & Steel Co., Allen R. Hoffer Co., Wilkoff Co., Hilb & Bauer, Hyman-Michaels Co., David J. Joseph Co., Luntz Iron & Steel Co., Hausman & Wimmer Co., and the M. Ehrlich Iron & Metal Co.

Acquires Brainard Hoop Plant

E. Theodore Sproull, vice-president, National Association of Flat Rolled Steel Manufacturers, has bought all the stock of the J. W. Brainard Steel Co., Warren, Ohio, manufacturer of cold-rolled strip steel, galvanized strip steel and patented hoops. The name has been changed to Brainard Steel Corporation. Expansion and changes are planned. Mr. Sproull is president and treasurer, and W. J. Adamson, formerly sales manager of the strip steel division of the Acme Steel Co., Chicago, is vice-president and secretary. James W. Brainard is retiring after 47 years in the business.

Thomas F. Kelly Heads New York Scrap Chapter

Thomas F. Kelly, Brooklyn, was elected president of the New York chapter of the Institute of Scrap Iron & Steel, Inc., at a meeting of the chapter on May 7. Other officers elected were: Herman D. Moskowitz, Schiavone-Bonomo Corporation, New York, first vice-president; Thomas G. Watson, Brooklyn, second vice-president; Al Gerson, Harlem Metal Co., New York, secretary; Louis Fisher, of Fisher Brothers Scrap Iron & Steel Co., treasurer; Charles Pfeiffer, Charles Pfeiffer & Co., Inc., New York, chairman of executive committee; H. A. Daly, Long Island City; Aaron Lippman, New York Scrap Iron & Steel Co., New York; M. L. Tyroler, Luria Brothers & Co., New York; and David Strauss, Continental Iron & Steel Co., New York, members of executive committee.

Dutch Furnace Has Good Year

WASHINGTON, May 14.—The only blast furnace plant in the Netherlands, that of the N. V. Koninklijke Nederlandsche Hoogovens en Stallfabrieken, at Ijmuiden, marketed its entire output of 258,224 metric tons for the fiscal year ended March 31. Output in the previous year was 203,692 tons, according to a report received from Consul-General C. L. Hoover, Amsterdam. Exports in the last fiscal year increased to 215,714 tons, valued at $3,517,200, from 149,633 tons, valued at $2,417,600, while imports were 35,628 tons and 31,727 tons respectively. Exports in 1928 were: Belgium, 61,661 tons; France, 40,041 tons; Germany, 33,148 tons; United States, 29,332 tons, and Great Britain, 15,135 tons.

Sound Ingots Are Under Study

British Iron and Steel Institute Continues Important Work on Uniform Steel—Blast Furnace Operation and Dry Blast Also Under Review

LONDON, May 3.—At the annual meeting of the Iron and Steel Institute, which marked the sixtieth anniversary, the incoming president, Prof. Henry Louis, recalled that exactly fifty years ago he read a paper before the Institute. In his inaugural address this year he presented some notes on the antiquity of iron, and from a brief review of the principal events in its history, concluded that the ability to produce high heats and the various stages of iron manufacture are not two independent concurrent parallel lines along which the development of human civilization has traveled, but that they are interrelated as cause and effect. A limit has now been reached in the electric furnace where iron is volatilized.

He pointed out that each successive metallurgical advance had been attended by a depreciation in the quality of the product (except in cases when an entirely new material had resulted) though each had been accompanied by such an increase in quantity of output as to more than compensate for the inferior quality. Recent advances had all been in the direction of improvement in quality and in the attainment of properties in which ordinary iron by itself was deficient, and the future of the metallurgy of the metal will be directed by the application of principles developed by scientific research.

Sound Steel Ingots

Sir Charles A. Parsons (who was awarded the Bessemer medal at this meeting) presented a paper in collaboration with H. M. Duncan entitled "A New Method for the Production of Sound Steel." They noted that rotors for large steam turbines require forgings having the utmost uniformity and ability to resist centrifugal bursting stresses. Such forgings require sound ingots with the minimum of non-metallic inclusions and segregated carbon and other elements. To make such steel the authors propose a mold having a heavy chill for its bottom—a slab about four feet thick. The walls are of fire brick, circular in plan, and the mold is covered with a perforated brick arch. These refractory walls and roof are heated to the temperature of the molten steel, then placed on the chill bottom, and the steel teemed rapidly through a hole in the roof. The mold is not completely filled; space is left under the arch for gas flames to keep the top molten. By these devices the ingot (cheese-like in shape) solidifies from the bottom up, the isothermals at all times being approximately horizontal planes. Surfaces cut from such ingots in various directions were sulphur-printed and etched to show macrostructure and secondary crystallization. Numerous test specimens also indicate a general equi-axed graining with no trace of "V-segregate" or axial weakness. Round ingots of this style are forged in the usual manner under a press by casting a head on the top after it has just set, and grasping this head with a porter bar. By this means 72-in. ingots weighing 20 tons have been forged into a 40-in. bloom in one heat.

Mushy Range in Commercial Steels

The committee on the heterogeneity of steel ingots also presented its third report. This differs in character from the preceding ones, which were records of the collective work, whereas the present report consists of four sections devoted to researches into fundamental matters. One section contains the report by Prof. J. H. Andrew and Dr. D. Binnie on the liquidus and solidus ranges of some commercial steels. Cooling curves were taken on molten steel to determine these temperatures. A molybdenum wound furnace and a tungsten-molybdenum thermocouple (silica protection tube) were used, operating in a reducing atmosphere of hydrogen and nitrogen. The steels were contained in a sealed and covered crucible made of carborundum, lined with alundum. Melted in this manner no carbon was lost.

Each per cent nickel or nickel plus chromium was found to depress the beginning of freezing 4.8 deg. C., but the end of freezing is at the same temperature as a corresponding carbon steel. This indicates that the alloying elements exist as a solid solution; the mushy stage is narrowed; the steels therefore freeze more quickly, and should show less segregation—a fact already proved in prior reports of this committee. Nickel-chromium steels containing 0.20 to 0.40 per cent molybdenum depressed the liquidus the same as the nickel-chromium steels, but the end of solidification was 30 to 50 deg. lower. The latter depression confirms the inference that molybdenum solidifies as a carbide, and is responsible for the fact that ingots of molybdenum-bearing steels studied by the committee showed marked and parallel segregation of molybdenum and carbon. This report also contains an interesting discussion of the formation of delta iron and its influence on carbon distribution.

Solubility of Sulphur in Steel

Another section of the report of the committee on steel ingots contains studies of the solubility of iron and manganese sulphides in steel, also by Prof. Andrew and Dr. Binnie. The method of attack consisted of melting pure iron with sulphur, manganese metal being added when required. It has been definitely shown that sulphur may be retained in solution in an iron-sulphur alloy by rapidly chilling the melt, and that deposition of sulphide of iron occurs on reheating the alloy to a temperature above 900 deg. C. Results with manganese-iron-sulphur alloys are indefinite, but seem to show that manganese sulphide is only very slightly soluble in solid iron.

Trends in Blast Furnace Practice

A committee, under chairmanship of A. K. Reece, has been investigating various features of modern blast furnace plant and practice, and the first report was presented at this meeting. It lays further emphasis upon the importance, from the competitive standpoint, of modern practice and plant by those who have not adopted those economic features which have become practically standard among their competitors. The three objects which must be attained, in the order of importance, are:

a. Uniform quality;
b. Lowest cost per ton;
c. Maximum output.

The committee reports that rich, easily reducible ores are prime factors in attaining these results; general opinion favors strong coke of open texture and of moderate, uniform size. One per cent increase in the coke ash is usually figured to decrease its value two per cent. Emphasis is laid on the vital importance of sizing the charge. It is said to be the practice at some Continental plants to exclude everything from the blast furnace smaller than an inch cube. Very few British plants do any crushing and screening prior to making up the burden. Sintering of unavoidable fines and recovered dust results in improved furnace operations, and is reported to be "standard" in Germany and the United States. Uniform distribution in the furnace is also very important; a modern tendency is to

increase the size of the coke unit per round of charge, even up to 7 tons, one of the objects being to give ore and coke the least opportunity for contact in the upper reducing zone, thus preventing direct reduction by carbon. Sizes of furnaces are limited by throat and bell diameters, and the influence these have on distribution of the burden; this limitation may be overcome by more uniform sizing of raw materials, or a radically new distributor.

Recent information seems to show that the turbo-blower is at last making headway against the gas-driven blowing engine in Germany, "doubtless due to its greater simplicity, lower first and operating cost, the improved economy in high-pressure steam generation" and need of larger units for hard-driven furnaces. Fuel economies generally are had by cleaner gas, automatic control of burners, and insulation against radiation losses. Boiler units producing steam at from 300 to 600 lb. per sq. in. pressure, from cleaned blast furnace gas (with pulverized coal as stand by) are being installed. A wider use of pressure, temperature or volume indicating and recording devices is also noted.

Dry Blast Operation

The recently introduced method of drying atmospheric air by means of "silica gel" and the installation of such a plant at a Scottish works, was discussed by Edwin H. Lewis. He gave complete figures for twenty months' operation.

The average silicon during the twenty months is given as 2.56 per cent as against 2.90 per cent in 1925, while the carbon consumption was 1943 lb. instead of 2055 lb. Of the total saving of 112 lb. of carbon per ton of iron, 63 lb. is due to the lower silicon content. It has been found very much easier to make lower silicon iron with dry blast; in fact, when good coal was available it was possible to make basic iron with less than 1 per cent of silicon and less than 0.06 per cent of sulphur, with 90 per cent of raw coal and a carbon consumption of 1622 lb. per ton of iron.

On three different occasions the moisture in the blast has been below 1 grain per cu. ft., and each time the burden had to be decreased to avoid "cold" iron. It appears, therefore, that 1 to 1½ grains per cu. ft. is the best amount of "dryness" at which to aim.

Among other advantages of dry blast observed during the twenty months are the absence of "slips," the quick recovery of sticking furnaces, and the possibility of using a larger proportion of soft coal with a decreased proportion of coke. The total quantity of water removed from the blast was 2373 tons, or 32 lb. per ton of iron.

The question of the life of the silica gel was raised by Prof. C. H. Desch, who asked how traces of tar could be kept out of the gel and how often the latter had to be renewed. The question was also raised as to whether as good a result could be obtained by Mr. Lewis' method by using typical blast furnace coke instead of raw coal. Mr. Lewis said that the cost of the silica gel plant could be wiped out of savings in a few years. He added that coke could be used for furnace fuel with the same advantage as coal.

Selling Machinery Abroad

Industrial Advertisers Discuss Problem at Conference with Department of Commerce

INDUSTRIAL advertising and selling was the subject of a conference held in Washington, May 10, under the auspices of the National Industrial Advertisers Association, the industrial committee of the Association of National Advertisers and the Associated Business Papers. Those who contributed to the meeting were largely members of the staff of the Department of Commerce, and the first session was opened with a welcoming address by Secretary of Commerce Robert P. Lamont, and the feature of the last session, a banquet, was an address by Dr. Julius Klein, Assistant Secretary of Commerce. The president of the industrial advertisers association, Nelson S. Greensfelder, Hercules Powder Co., Wilmington, Del., was in the chair for the day sessions, and Frederick M. Feiker, managing director of the Associated Business Papers, presided at the dinner.

What of Foreign Machinery Competition

American machinery is finding a market in Europe, said Doctor Klein, because of its capacity to do other things than to save labor and develop mass production. "Much of the vast tide of American capital now flowing to all parts of the world," said he, "at the rate of more than a billion dollars a year is finding an outlet through new industries. Though some of them do represent direct competitive threats to our trade, on the whole the broad stimulation which they will effect in the advancement of earning capacity and better living will be bound to provide newer and ever widening opportunities for our general commercial advancement."

A like thought was expressed by Grosvenor M. Jones, chief of the finance and investment division of the Department of Commerce, who suggested we might naturally look for a reduction in exports of automobiles, for example, on the score that competing enterprises of the kind are being encouraged by American foreign investments and American participation in foreign automobile factories. He held that the gradually improving status of the inhabitants of other parts of the world resulting from such developments as road building to satisfy existing users of motor vehicles was calculated to require increasing numbers of such vehicles with continuing American participation.

Market Data Book

Dr. Frank M. Surface, assistant director of the Bureau of Foreign and Domestic Commerce, discussed the needs of census facts respecting distribution to industry. He told of the market data book now in preparation giving by counties the number of factories, the wages paid and the value added to the products by manufacturers; this, he said, will be available the latter part of this year. He referred to the commercial survey made some time ago of the Southeast and one of New England, now in process of printing. Similar surveys, which are admittedly of value in considering consumer goods rather than those going to industry, are under way for the Pacific Southwest, the Gulf States and the Pacific Northwest.

Walter H. Rastall, chief, industrial machinery division, Department of Commerce, raised the question whether or not under the existing sales methods far too much responsibility is placed upon the individual salesman or that too much depends upon his individual initiative. "Only rarely do you find teamwork in these sales organizations," he argued. "It is almost as though every salesman were a sales manager. This situation prompts us to plead for a reconsideration of present-day sales methods as applied to the distribution of capital goods, for we are of the impression that existing methods are unscientific and wasteful in the extreme."

Dealing only with strictly industrial machinery as used in factories, mines and in construction, the United States he continued, is exporting about $1,000,000 worth of such machinery daily. "We are the greatest machinery exporting nation in the world and the machinery we export is distinguished for its high quality; it enjoys a very definite prestige on the world's market, but because of its very quality, its outstanding superiority, it can be adequately supported on the world's markets only if presented by high-character salesmanship."

General Refractories Co., Philadelphia, has appointed Woodward & McMillan, Edificio Metropolitana, Havana, Cuba, as sales agents in Cuba and Central American countries.

This Issue in Brief

Tungsten carbide tools last 30 times as long as high-speed steel without regrinding, on automatic chucking machine tooled and placed in operation on a production basis. A. S. M. E. survey reveals that experience of users of the new cutting alloy confirms published claims.—Page 1349.

* * *

Heat treats aluminum alloy parts economically in pit-type electric furnace. Airplane engine builder finds that this type of furnace operates with an economy of power. For a given cubical volume, the radiating surface is practically a minimum.—Page 1347.

* * *

Vacuum melting and casting process doubles impact value of a chromium-nickel alloy. Metal is melted, refined and cast in a vacuum. The process increases ductility and lowers hardness, by eliminating non-metallic impurities.—Page 1348.

* * *

Diamond cutting tools impart a mirror-like finish to machined parts. Polishing costs are eliminated. Thousands of pieces can be turned with one setting of the tool, and accuracy is increased.—Page 1345.

* * *

April steel output second highest on record. Daily ingot production average was 189,924 gross tons, exceeded only by March, 1929, with 194,548 gross tons.—Page 1373.

* * *

Within nine years rails of 100 lb. or more to the yard have increased from about one-quarter of the total production to close to three-quarters.—Page 1346.

Jump cuts may be taken with diamond cutting tools. Speeds up to 1000 ft. a minute are possible, and feeds from 0.001 in. to 0.003 in. a revolution, regardless of the material being turned. Turning and boring accuracy to within 0.0001 in. is obtainable.—Page 1344.

* * *

Electric gray iron castings produced at almost the same cost as cupola product. Rotating electric furnace is of two-ton capacity. Charge of 500 lb. is melted in about 1 hr. Metal produced has a dense, fine grained structure of improved machinability and superior strength.—Page 1351.

* * *

Distribution cost averages 20 per cent of selling price, mill supply houses find. They complain of low discounts on many items.—Page 1356.

* * *

Chromium plating is successfully applied to aluminum castings and rolled material. Lightness is combined with improved appearance, hardness and resistance to marring and other surface changes.—Page 1361.

* * *

Coolant not needed when tungsten carbide tools are used, A. S. M. E. survey indicates. However, greater provision must be made for chip disposal.—Page 1350.

* * *

Welding saves worn manganese castings. Worn parts are built up by the use of welding rods containing 4 per cent managanese and 3 per cent chromium, welded with oxy-acetylene torch.—Page 1340.

Cutting property of stainless steel improved by adding sulphur. The objectionable feature of this element, which is red shortness in the steel when it is rolled or forged, is eliminated by having the sulphur present in the form of zirconium sulphide. Resistance to corrosion is not lessened.—Page 1341.

* * *

Resists corrosion at high temperatures. Nickel-chromium rustless iron, containing 18 per cent chromium and 8 per cent nickel, is said to resist corrosion up to 2100 deg. Fahr. It can be cold-worked easily, and takes a mirror-like finish, which will not tarnish or rust.—Page 1341.

* * *

Machine tool changes necessary to get full benefit of use of tungsten carbide cutting tools will be largely incidental to increases in cutting speeds, says A. S. M. E. investigating committee. It is questionable whether the new material will ever be capable of standing heavier cuts than are taken with high-speed steel.—Page 1350.

* * *

Industrial purchasing power is highly concentrated among big plants, Department of Commerce survey reveals. Of 474 plants, in one East Central city, 17, or about 3½ per cent, represented over 58 per cent of the purchasing power.—Page 1358.

* * *

Poisoning from cyanide used in case-hardening leads German Government to require that shop floors be cleaned at least daily, and that articles to be case-hardened be thoroughly dry when introduced into furnace.—Page 1343.

A. I. FINDLEY
Editor

THE IRON AGE

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Managing Editor

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Is Steel "Seasonal"?

SOME developments last year, and still more striking developments this year, bear on the often discussed question whether steel is seasonal as to total demand. Observance of the rate of operation at different times in the year has always suggested an affirmative answer but adequate explanation has been difficult. In the great majority of years production would decline to a low point in July and to a secondary low point in December, while quite regularly it would mount sharply in the first three months of a year and would show a less sharp rise after July.

Up to 1927 the seasonal swing was plainly marked, the fluctuations being quite uniform. A plausible theory was that there was preparation first for summer work and then for winter work. This required an assumption that there was forward buying. Not that a great deal of steel would be put into stock, but that commodities made from steel would be bought seasonally, even though there might not be much variation in actual consumption, putting all lines together.

Lately there have been decided departures from the swings previously marked so plainly. First we had the second half of 1927, with no up-turn in production after July. Then 1928 brought three departures: First, the peak came in April, instead of in March as in the four preceding years. Second, June was the low month instead of July, shortening the period of decreasing production at both ends. Third, production ran slightly heavier in the second half of the year than in the first half, when the apparent "normal" had been a decrease of 10 per cent or thereabouts.

Now we have this year practically no decrease up to a date when there has always been a marked decrease. Steel ingot production in April fell off 2.4 per cent from March, but the fact is that open-hearth production decreased 3.8 per cent while Bessemer production increased 7.3 per cent, and no one will imagine that producers of open-hearth steel suffered from a lack of orders while producers of Bessemer steel received more orders. Evidently the open-hearth decrease was due to physical causes.

On one thing the records are clear—that if there is a summer low point in steel production it must come not later than July. It is now too late for a substantial decline to run up to July, with recovery immediately following. Consumers have found it so hard to get full deliveries in the last few months that they will not let mills lie idle in July if they are going to need heavy deliveries again in August. While there is no predicting what the whole second half of the year is going to be like, a summer trough seems now out of the question. This is not to say that there will be no variation in production, for hot weather may make its own curtailment, though small. That would be purely physical and the point here considered is demand, not production. If production is under demand in July that will make the market situation correspondingly stronger.

Great Gain in Sheets and Strips

THE experience of the last few months has shown that there is room enough in the steel market for both the sheet mills and the strip mills. Two years ago there was much doubt about this. What has come meanwhile is a tremendous increase in demand. In just two years, from 1926 to 1928, the combined production of strips and black sheets increased 30 per cent, while the production of all rolled iron and steel increased only 6 per cent.

Statistics of production of hot rolled strip, including strips for cold rolling, have been collected since 1920 and are given below. The production of sheets as given is that of sheet and jobbing mills only, there being apart from that a few hundred thousand tons of tin mill specialties produced by tin mills outside of their output of black plate for tinning:

Sheet and Strip Production—Gross Tons

	Sheets	Strips	Total
1920	2,886,401	586,524	3,472,925
1921	1,511,817	238,005	1,749,822
1922	2,917,236	641,310	3,558,546
1923	3,503,071	865,506	4,368,577
1924	3,266,430	827,101	4,093,531
1925	4,096,832	1,248,635	5,345,467
1926	4,237,479	1,222,089	5,459,568
1927	3,979,037	1,318,419	5,297,456
1928	4,963,410	2,161,988	7,125,398

As an industry grows older, approaching a possible maturity, it may be expected to increase less rapidly, in point of percentage if not in point of actual quantity. Just the reverse is observed in the sheet and strip tonnage. From 1920 to 1926 the average increment was 7.8 per cent per annum, while from 1926 to 1928 it was about 15 per cent.

Of course strips, being the newer product, were likely to grow more rapidly than sheets. In tonnage they gained a little more than sheets from 1926 to 1928 and of course much more in point of percentage, but sheets have had a very substantial increase—a million tons from 1927 to 1928.

It would be interesting to know how much of the strip gain has been at the expense, so to speak, of sheets, where wider and thinner strips were made last year than a few years ago. Probably a full showing would not bring out any very large tonnage gain in that direction. The use of narrow strips has been

growing very rapidly. Also there has been a large increase in demand for very wide sheets, in which sheet mills will doubtless always be ahead. At least half a dozen sheet mills now make sheets nearly double the widest strips available, and several gages thinner. Also a mill to roll sheets 66 in. wide is nearing completion at Toronto, Ohio, while one to roll 72-in. sheets is to be built at Farrell, Pa., the product going chiefly into automobile bodies.

The Case of Mr. Sinclair

HARRY F. SINCLAIR'S incarceration in a Washington jail has evoked a series of homilies. Senator Tom Heflin has found fault with the attention accorded the prisoner by his jailers and the newspapers, while the metropolitan press has preached editorial sermons upon the ending of a slimy trail.

Mr. Sinclair may not be as fragrant as the lily of the valley. But he lost his liberty not for felony; rather for contempt of the Senate of the United States. For that body as now constituted a good many persons feel contempt. There is a difference, however, between sentimental contempt and legal. In incurring the latter form, with its penalty, Mr. Sinclair undoubtedly acted throughout upon the advice of his legal counsel. In all fairness it would seem as if his eminent professional advisers ought voluntarily to go to jail along with him, even if they were immune from sentence.

Seriously speaking, already there has developed firmly the legend that during the administration of President Harding a great scandal arose in connection with the public oil lands, wherein Mr. Sinclair aimed to cheat the American people, but was frustrated by a combination of sleuth and paladin in the person of Senator Walsh; and in the end the National Treasury recovered many millions of money resulting from oil pilfered from the people.

By the decision of the Supreme Court of the United States the leasing of the Teapot dome was illegal for the reason that it had not been advertised according to law, or something like that. But irrespective of how it was leased the terms were in conformity with those of oil leases everywhere in this country, plus some very favorable bonuses to the Government. There was not, therefore, any plot to plunder.

The Government got its royalty. After it had been decided by the highest court that the lease was illegal the lessee was in the position of having been an invader and had to surrender the entire gross proceeds, regardless of the cost of production, as a matter of common law. That is how the Treasury recovered its millions. Similarly the Government got for nothing the storage tanks that were built in the Portsmouth Navy Yard.

The Continental Trading Co. had nothing to do with any of this. Nor did the Sinclair Consolidated Oil Corporation, which is a very great company, except as a victim. The latter company was led to build a pipe line out to Wyoming at a cost of about 27 million dollars, to bring Wyoming oil, including Teapot, eastward to market; but the Teapot dome proved to be a petroliferous fiasco (productively as well as politically) and the pipe line is idle and about to be torn up.

The oil scandal legend that has become a matter of popular belief, even of intelligent belief, is not founded on a knowledge of facts. Only last week the Pulitzer prize of $1,000 for the best example of a reporter's work during 1929 was awarded by a professional committee to Paul Y. Anderson "for his highly effective work in bringing to light a situation which resulted in revealing the disposition of Liberty bonds purchased and distributed by the Continental Trading Co. in connection with naval oil leases." The matter of the Continental Trading Co. was no doubt a picturesquely scandalous affair, but it ought to be obvious that it had nothing to do with the naval oil leases.

This whole subject is of scientific interest as a contemporaneous illustration of how history is miswritten. If thus of the present, what of the past? It may be that Benedict Arnold and Aaron Burr were not so vile as our school books tell us; and Samuel Adams and John Hancock were perhaps not so virtuous.

The New Economic Geography

ECONOMIC geography, as the term is used today to indicate a specialized branch of research and its applications, is relatively young in its service to the business world, but it has had a rapid growth and is accepted as an established industrial science. The beginning was made hardly a generation ago, when the University of Chicago and Harvard University created chairs in geography and built up departments that were the pioneers not only in America but in the world.

Of course, geography had always been taught, but not on this highly specialized plan, the basis of which is comprehensive and intensive research, always with the aim of economic benefits to mankind. Many other colleges and universities of the United States have followed Harvard and Chicago, until departments of geography are so common as to be accepted without comment in the curriculum of higher education. They have numerous postgraduate students, many of whom go so far as to receive their doctor's degrees. Strangely enough, until recently no European country, not even Great Britain or Germany in their aggressive striving after foreign trade, has offered through the university a course in geography comparable with those under discussion. Now a number of foreign universities have adopted the American idea and in several instances have secured American trained men to establish and conduct their courses.

Modern departments of geography are operating on practical lines. Professors and students do a great deal of field work in the United States and foreign countries, even in remote and little known lands. Their study is on broad lines—of peoples, their characteristics, their present needs and the possibilities offered for their future needs; of the influences of climate and environment; of soils and their products and the possibilities for other products; of industry and trade; and on and on in a wealth of detail much of which hitherto has been unavailable to business.

A great mass of new knowledge has been brought together, and collated and arranged for practical everyday use. In fact, industry has already profited largely from this new science. Business houses have learned that money is to be made through its use, and some of them have taken it on in a big way. One

great steel company, for example, has gone so far as to maintain a geographer of international prominence as a regular member of its staff, and his several years of service are held to have been of prime importance in developing the company's foreign trade. Trained economic geographers have played an important part in the great work done by the Department of Commerce, inaugurated under the direction of President Hoover, in gathering and distributing useful information of the world's trade, which has been of inestimable value to the industries of the country. Those closest to the work of the new geographers declare with enthusiasm that, while they have already done much, only a beginning has been made.

"But Our Business Is Different"

MENTAL inertia is one of the heaviest handicaps of American industry. Constructive imagination is rare, easily discouraged or frightened, and too prone to be bluffed by matter-of-fact boards of directors. These points were brought forcibly to the front in the discussion at a recent engineering meeting in Detroit.

Instance after instance was cited of suggested improvements which were coolly waved aside with the remark: "That might do very well for such and such an industry; but, you see, our business is different." Failure to discern wherein A's experience might benefit B, even in industries generally similar in operations, has blocked a step which might have meant many thousands in added profit.

An outstanding citation of an important improvement "imported" from outside industries was that of the continuous rolling of steel sheets, which was credited in the Detroit discussion to the paper industry. Several papers were read to show how the manufacturing methods so characteristic now of the automotive industry have been applied successfully to others: plate glass, electrical appliances, gas stoves, washing machines.

Businesses are essentially interdependent with regard to products, financial success, sales efforts, manufacturing schedules, control of operations. With great profit they can be made similarly interdependent in the promulgation of ideas. C can learn from D how to handle his product with least effort and at lowest cost. E can teach F worthwhile tricks in heat treating. And D can profit from F's experience with a difficult machining operation. None of the group has a "corner" on valuable information in any of these lines.

Adaptability must be practiced. One man's highly effective method may not fit precisely into his neighbor's needs. But with a little alteration here and there it often can be made to function and to give exceptional service. What is most needed is a mind open to what offers and determined to use what is usable, even though another man's brain or another man's organization did happen to see it first.

And there is no room for the refrain, "But our business is different."

CORRESPONDENCE

Reliable Heat Treatment of Rope and Cable Wire

To the Editor: I am much interested in the heat treating of steel products, and noticing your very interesting editorial "Is Heat Treatment Always Reliable?" I can't help making a response in favor of heat treatment.

While I do not consider myself an expert on heat treating, I have had considerable experience in the work, especially on high-carbon and high-manganese wire products.

There are so many factors that enter into the manufacture of rope and cable wire that to lay the entire blame of the failure of the wire you mention to the heat treating is unwarranted, provided the heat treatment of this wire was properly handled. Considerable attention should be given to probably improper and non-uniform heating, time factor of material being treated, seamy and piped steel, over-drafting, improper cleaning, coating and baking, segregation, and insufficient testing facilities.

The practice of manufacturing cable or rope wire in the past was to draft direct from an acid steel; but in my opinion a better and a uniform product that will improve with age, instead of "washing out or self-annealing," as in your article, can be produced from a properly heat-treated metallically-tempered steel. While the testing of the wire in question proved the product to be up to specifications, this does not always prove the quality, and should not be considered as conclusive evidence. I have tested and handled high-carbon spring wire that would test out perfect at one end of the coil. Split the coil and take a test from the center of the coil and it would fail, showing a spotty condition that no known method of testing would catch. This condition could be accounted for in the heating (probably the stopping of the machinery for a few seconds or minutes, with overheating the material at the point of stop), or it could come from an in and out seam.

There is also another phase in connection with the manufacture of this type of wire, which ties up somewhat with the fact that these wires broke after erection of the bridges and not in the process of erection, and explains the constructor's idea of "washing out" and "self-annealing." He is correct if the material is over heat-treated, as can be the case. For instance, take a steel containing 0.50 carbon and 1.00 manganese. It can be heat-treated in such a way as to give the same physical properties as 0.70 carbon, 1.00 manganese, but it would mean inducing strength in the wire greater than its chemical properties could absorb and hold, and in time it would reduce back to its original state, giving the appearance of acid brittle.

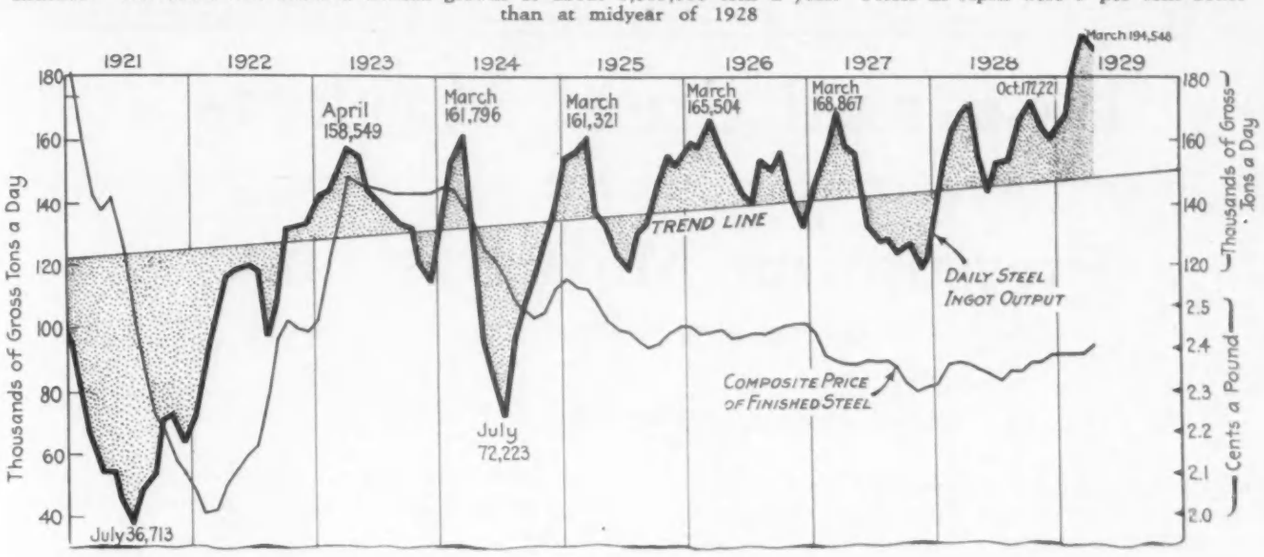
In conclusion, I again say that tests of material of this kind should be used only to determine if it is up to specifications demanded, and not as a proof of quality. Quality should be up to the person who knows his heat treating and the different processes from the raw material to the finished product; who knows the proper structures of steel to give best results, and is able to check his work at different points of processing by analyzing physical properties and structures.

Yours for improved methods of heat treatment,

J. J. CAUGHERTY,
American Steel & Wire Co.

Donora, Pa., May 9.

Ingot Production in April Showed a Drop of 2 Per Cent from March, but Otherwise Was at the Highest Daily Rate Ever Reached. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in April were 3 per cent better than at midyear of 1928



Steel Ingot Output Continues High

April Production Exceeded Only by March—Daily Rate for Four Months Greater Than Any Single Month's Average Prior to 1929

PRODUCTION of steel ingots in April was higher, both in total tonnage and in daily average, than had ever been achieved before, with the sole exception of the preceding month. As reported by the American Iron and Steel Institute, the total was 4,938,025 gross tons, comparing with 5,058,258 tons in March (revised figure). On the daily basis, with 26 working days in each of the two months, the April average was 189,924 tons, against 194,548 tons in March.

For first four months of the year the aggregate tonnage of open-hearth and Bessemer steel ingots reached 18,812,637 tons. This is larger than the entire year's output for any year prior to 1905. It compares with 16,846,958 tons for the first four months last year, which was the previous highest total ever reached in the first third of a year. In 1926, when the highest figure prior to 1928 was made, the four-month total was 16,491,677 tons.

For the four months of this year the average daily output for 103 working days was 182,647 tons. Never, preceding March of this year, did the average daily output for a single month reach that figure. Last year the four-month average was 163,563 tons a day.

It is noteworthy that in April the reported tonnage of open-hearth ingots showed a drop of nearly 4 per cent, whereas the reported tonnage of Bessemer ingots indicated an increase of more than 7 per cent. This is contrary to the usual trend of gradual displacement of Bessemer steel by open-hearth steel. Compared with a year ago the four-month figures show an increase in open-hearth steel reported, amounting to 12.6 per cent. Bessemer steel tonnage reported in the four months was 5.8 per cent greater than a year earlier. It happens that the Bessemer tonnage reported in April was the largest for any month since January, 1925.

Electric and crucible steel ingots, no longer reported monthly by the institute, amounted to 460,208 tons in 1928—the largest tonnage ever reported. On the basis of 311 working days, this figures out at 1480 tons a day. A figure of some such magnitude, to allow for ingots made by the electric and crucible processes, should be added to the daily output figures given above, if comparisons are to be made with earlier years, such as are shown in the diagram.

Not only has the tonnage for the first four months broken all records for the first third of any year, but it is greater than the output for any other consecutive four months. The largest group of earlier months was in 1928, when August, September, October and November provided an aggregate of 17,243 306 tons.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,273,294	498,691	3,990,902	26	153,496
February	3,300,407	521,250	4,043,457	25	161,738
March	3,692,648	567,330	4,507,217	27	166,934
April	3,505,104	564,110	4,305,382	25	172,215
Four months	13,771,453	2,151,381	16,846,958	103	163,563
May	3,394,301	582,128	4,207,212	27	155,823
June	3,010,341	528,193	3,743,903	26	143,996
July	3,068,257	528,588	3,805,598	25	152,224
August	3,379,625	569,771	4,178,610	27	154,763
September	3,375,654	544,710	4,147,893	25	165,916
October	3,795,800	599,098	4,649,968	27	172,221
November	3,442,112	590,669	4,266,835	26	164,109
December	3,301,114	496,679	4,018,208	25	160,728
Year	40,538,657	6,591,217	49,865,185	311	160,313
1929					
January	3,694,218	549,616	4,490,354	27	166,309
February	3,599,224	489,279	4,326,000	24	180,250
March	4,183,869	596,691	5,058,258	26	194,548
April	4,026,576	640,351	4,938,025	26	189,924
Four months	15,503,887	2,275,937	18,812,637	103	182,647

Figures for 1928 are all revised, full returns for the year having become available; correspondingly, the calculated totals for January, February and March, 1929, are revised.

Iron and Steel Markets

Pressure on Mills Sustained

Aggregate Demands on Steel Producers Show Little Change —Double Price Basing Plan Proposed for Blue Annealed Sheets—Valley Basic Iron Higher

THE momentum of steel production and demand is a source of surprise to both sellers and buyers. Mills continue to operate virtually at capacity, and, if the rate of output does not equal that of March or April, it is because shutdowns for repairs are more frequent. Specifications still fail to give convincing evidence of a decline in steel consumption. Diminishing shipping orders for automobile steels are offset by larger releases of other finished products.

Increased specifying for bars, plates and shapes at Pittsburgh has caused an extension of deliveries on those products. A decline in bookings at Chicago is interpreted as indicating that many buyers have fully specified against their second quarter contracts.

Buying for third quarter has not yet begun, but active interest of large users in their needs for that period and continued efforts of some buyers to place supplementary orders for earlier shipment point to a well sustained rate of steel consumption.

Although deliveries on certain products show some improvement, mills still find difficulty in supplying steel as rapidly as it is wanted, and in some instances have farmed out orders to competitors better able to meet the time requirements of their customers. The shortage of semi-finished steel remains a source of embarrassment and, with little likelihood that the scarcity will soon be relieved, a possible advance in prices for third quarter is being taken into account.

It is the possibility of higher crude steel that has caused mills to move in the direction of advances on finished products. A few makers of automobile body sheets have announced third quarter quotations of 4.20c., Pittsburgh, an increase of $2 a ton. Advances, however, are not favored by all mills in view of the uncertainty of demand in the last half of the year.

Third quarter prices on common finishes of sheets named by the Inland Steel Co. are unchanged from existing quotations except on blue annealed. Under a reclassification, now being adopted by other mills, separate bases are established for No. 12 gage and heavier and No. 13 and lighter. For producers quoting on a Pittsburgh base the new prices represent an advance of $1 a ton.

The steel for a gas line from Monroe, La., to Atlanta, 130,000 tons, has been divided among four pipe makers. The Steel Corporation subsidiary and two independent mills will supply lapwelded pipe, while the remainder—about half the tonnage—will be electrically welded pipe from the Milwaukee fabricator. The large requirements of the latter company help to explain the heavily sold condition of Chicago plate mills, which are booked through the major part of the third quarter.

Although there are now indications of a slackening of automobile production during the summer, growing export business is counted on to moderate the recession. Farm equipment makers are taking steel at an unchanged rate. Structural steel awards are unimpressive, totaling 27,000 tons for a second week, but lettings of concrete steel bars, at 10,000 tons, have been exceeded only once since Jan. 1. Construction work in St. Louis is at a standstill because of a strike, and a dispute in the building trades in New York may have similar results.

Railroad equipment builders are consuming considerable steel, although there have been no notable additions to their bookings recently. The Pennsylvania Railroad will build 1000 cars in its own shops. The placing of 13,200 tons of plates for two ships for the Matson Navigation Co., San Francisco, is an early probability.

Signs of strength in the pig iron market may be traced to the pressure of steel demand. Two sizable purchases of Valley basic, reflecting extra requirements of steel producers, have firmly established that grade at $18.50 a ton, or 50c. above the recent price. Gray iron and malleable foundries are taking pig iron shipments at an undiminished rate, but are in no haste to place contracts for third quarter. Meanwhile, merchant furnaces in some centers are beginning to press for business, this being particularly true in the New York metropolitan district and New England, where prices are easier.

Scrap markets are soft, and heavy melting grade at Pittsburgh has dropped another 50c. a ton to $17.75.

Steel ingot production in April, as reported by the American Iron and Steel Institute, declined 2 per cent from the total for March. The recession is attributed to interruptions for repairs necessitated by the wear and tear on equipment. With the sole exception of the March output, the April tonnage was the largest for any month on record. Production in the first four months was 18,812,637 tons, a gain of 2,000,000 over the previous record, one year previous, and larger than any entire year's output prior to 1905.

THE IRON AGE composite price for pig iron has advanced to $18.71 a ton, replacing last week's $18.67 as the highest figure reached this year. The finished steel composite remains for the seventh week at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous. Advances Over Past Week in Heavy Type, Declines in Italics

	May 14, 1929	May 7, 1929	Apr. 16, 1929	May 15, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.76	$21.76	$21.76	$20.76
No. 2, Valley furnace	18.50	18.50	18.00	17.25
No. 2 Southern, Cin'ti	18.69	18.69	18.69	19.19
No. 2, Birmingham	15.00	15.00	15.50	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.00
Basic, del'd eastern Pa	20.25	20.25	20.25	19.00
Basic, Valley furnace	**18.50**	18.00	18.00	16.50
Valley Bessemer, del'd P'gh.	20.76	20.76	20.26	19.26
Malleable, Chicago*	20.00	20.00	20.00	18.00
Malleable, Valley	19.00	19.00	18.50	17.25
Gray forge, Pittsburgh	**19.76**	19.26	19.26	18.51
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	36.00	36.00	34.00	33.00
Sheet bars, Pittsburgh	36.00	36.00	35.00	34.00
Slabs, Pittsburgh	36.00	36.00	34.00	33.00
Forging billets, Pittsburgh	41.00	41.00	39.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	44.00
	Cents	Cents	Cents,	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	2.04
Bars, New York	2.29	2.29	2.29	2.19
Tank plates, Pittsburgh	1.95	1.95	1.95	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.80
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	May 14, 1929	May 7, 1929	Apr. 16, 1929	May 15, 1928
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.70
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	2.80
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.70
Sheets, blue, 9 and 10, P'gh	2.10	2.10	2.10	2.00
Sheets, blue, 9 and 10, Chicago dist. mill	2.30	2.30	2.30	2.15
Wire nails, Pittsburgh	2.65	2.65	2.65	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$17.75*	$18.25	$18.75	$15.50
Heavy melting steel, Phila	16.50	16.50	17.00	13.50
Heavy melting steel, Ch'go	15.50	15.50	16.00	13.00
Carwheels, Chicago	14.50	14.50	14.50	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.00	15.00	15.50	14.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)	15.50	15.50	16.00	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	11.75
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.37½
Electrolytic copper, refinery	17.75	17.75	17.75	14.12½
Tin (Straits), New York	**44.25**	44.00	45.62½	52.50
Zinc, East St. Louis	**6.67½**	6.60	6.65	6.05
Zinc, New York	**7.02½**	6.95	7.00	6.40
Lead, St. Louis	*6.75*	6.80	6.85	6.00
Lead, New York	7.00	7.00	7.00	6.10
Antimony (Asiatic), N. Y.	*9.00*	9.25	9.75	11.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Consumption Holding Up—Specifications Increase in First Half of May—Basic Pig Iron Higher

PITTSBURGH, May 14.—Heavier specifications for some lines of steel during the first half of May, as compared with the same period last month, are interpreted as indicating definitely that demand for steel is really holding up and that recent heavy shipments have been going rapidly into consumption. A healthy condition is shown by the interest many large consumers are taking in third quarter requirements and by the desire of others to place supplementary orders now for delivery during the next six weeks. It is evident that the latter class of buyers underestimated their needs when contracts were made and are now very anxious to get the added tonnage. The question of price is overshadowed by the need of shipments.

Recent reports from the automobile industry are that May output will be high, and this is confirmed by the heavy shipments of steel. However, it is intimated that operating schedules of the Michigan companies will be revised downward in June. This slowing down is not yet evident to sheet mills, which now have heavy commitments for the greater part of that month, but makers of strip steel and cold finished steel bars are not so well supplied with orders. The tighter situation in sheets might be due to efforts by consumers to cover in case of continued deferred deliveries. Delivery promises on blue annealed sheets now average at least six weeks and are being further extended. On the black and galvanized products somewhat earlier shipments can be made, but commitments on auto body sheets are said to extend from eight to 10 weeks.

Some makers of body sheets have advanced the price for third quarter $2 a ton to 4.20c., Pittsburgh, and advances in the other grades are being contemplated in view of the probable higher price for semi-finished steel. Strip makers are also watching the price of crude steel with interest and would probably follow sheet makers in an upward revision. These advances are not favored by all mills in view of the uncertainty of demand during the latter half of the year, but non-integrated makers would be forced to protect themselves in the event of higher prices for raw materials.

Uncertainty prevails as to third quarter quotations on the heavy hot-rolled products. Consumers of bars, shapes and plates are not yet showing much interest in their requirements beyond July 1, but mills are considering higher prices for these products.

Ingot output in this district is still being maintained at practical capacity, and finishing mill operations were somewhat higher last week, at least on sheets.

Semi-finished steel is still very scarce, but is proving to be just about adequate in the immediate district. Operations are better adjusted to the supply than was the case a few weeks ago.

Higher steel prices are supported by a stronger pig iron market, and

two large transactions in basic were made in Ohio last week at $18.50, Valley. As both the buyers were steel companies, the purchases indicate that the semi-finished steel shortage has resulted in heavier pig iron requirements. The scrap market continues to decline and a large tonnage of heavy melting steel was sold last week at about $17.50, a decline of 50c. a ton.

Pig Iron.—Two sales of basic iron to Ohio consumers in the past week have definitely established the market at $18.50, furnace. In both cases the buyers were steel companies located outside of the Valley district. The quantities were 10,000 and 5000 tons. Other grades of iron are rather quiet and, with one or two exceptions, sales are confined largely to carload lots. A Pittsburgh district melter has not yet closed on 1000 tons of malleable, for which it inquired, and a Pittsburgh user of Bessemer iron is taking bids on 2000 tons of this grade for delivery in the third quarter. Sales of Bessemer and malleable had previously been made at $19, Valley, and the market may be said to have become established at that level. Sellers of foundry iron are actively seeking orders, but users are not disposed to commit themselves very far in advance. On the general run of small orders, the price is well established at $18.50. Heating and sanitary ware manufacturers are not operating at as high a rate as usual and are specifying slowly against their contracts. Furnace shipments are well sustained and iron is not being accumulated at any point in the Valley district.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—With a high operating rate for finishing mills virtually assured for the remainder of the quarter, it now seems probable that the shortage of semi-finished steel will continue into the second half of the year. Open-hearth furnaces are operating at about the limit of their capacity and are producing just enough steel to provide the minimum requirements of finishing mills. Its allocation is proving satisfactory except in instances when unusual mill requirements are encountered. No occasions of curtailed sheet mill operations because of a lack of crude steel have been reported during the last week in this district, but this department of the industry is still feeling the shortage keenly. Wire rods are readily available, but are moving steadily to the wire mills, and producers' stocks are no more than ample. The price is well established at $42, Pittsburgh or Cleveland. No announcement has been made as to third quarter prices on billets, slabs and sheet bars, but it is generally thought that the price will not be less than the present quotation of $36, Pittsburgh or Youngstown, with the possibility of a higher figure.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Bars, Shapes and Plates.—May is turning out to be a much better month than April in both specifications and new business. Operations have not been stepped up, except perhaps in plate mills, but deliveries are being extended in some cases and releases on contracts are just about equal to the present output. Heavy shipments of plates are being made to car builders and fabricators of barges, and rolling schedules for several weeks will include large tonnages of steel for these purposes. There is also talk of further barge building during the summer months, and, although no definite inquiries have been made, mills expect this work to provide a good outlet for steel in the third quarter. Structural lettings locally were not impressive in the last week, but the steady rate of small orders, together with adequate backlogs, is keeping fabricating shops fairly well occupied. Bars are active, and shipments as well as specifications are well diversified as to use. The price situation is steady, with 1.95c., Pittsburgh, the ruling quotation. There is a growing sentiment in favor of advancing the price for third quarter, but mills have not yet opened their books for that period and no announcement has been made.

Rails and Track Supplies.—Shipments are being well maintained, but new business is declining seasonably. In some cases, consumers are placing supplementary orders to complete contract tonnages, but the aggregate of this business is not large. Specifications on old contracts are coming in steadily, and, although not up to the rate of March and April, are considered satisfactory for this season. Prices are well established except on light rails, where competition on the part of rerolled product is bringing out occasional concessions of $2 a ton.

Wire Products.—The wire business is maintaining its recent improvement, and thus far May is proving to be a considerably better month than April. Manufacturers' wire is moving to the automobile and other large consuming industries at an excellent rate, and demand from the jobbers for fencing and barbed wire is satisfactory. Base prices on plain wire are being well maintained at 2.50c. to 2.60c., Pittsburgh. Some makers report a slight improvement in the demand for nails, but this is

The Iron Age Composite Prices

Finished Steel

May 14, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, nails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High			Low		
1929	2.412c.,	April	2;	2.391c.,	Jan.	8
1928	2.391c.,	Dec.	11;	2.314c.,	Jan.	3
1927	2.453c.,	Jan.	4;	2.293c.,	Oct.	25
1926	2.453c.,	Jan.	5;	2.403c.,	May	18
1925	2.560c.,	Jan.	6;	2.396c.,	Aug.	18

Pig Iron

May 14, 1929, $18.71 a Gross Ton

One week ago	$18.67
One month ago	18.46
One year ago	17.42
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High			Low		
1929	$18.71,	May	14;	$18.29,	March	19
1928	18.59,	Nov.	27;	17.04,	July	24
1927	19.71,	Jan.	4;	17.54,	Nov.	1
1926	21.54,	Jan.	5;	19.46,	July	13
1925	22.50,	Jan.	13;	18.96,	July	7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.95c. to 2.00c.
F.o.b. Cleveland	1.95c. to 2.00c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c. to 2.39c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.35c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Cleveland	3.04c. to 3.14c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb. S.A.E.

Series Numbers		Alloy Differential
2000	(1¼% Nickel)	0.25
2100	(1¾% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	2.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	24.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅞ in. and larger	$2.80
Spikes, ⅝ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	19

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+42
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	19
1 to 1¼	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	9
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	54
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

largely a seasonal manifestation and not up to the usual rate. Concessions from the price range of 2.65c. to 2.75c. are not uncommon.

Tubular Goods. — Approximately 130,000 tons of 18, 20 and 22-in. pipe has been placed for the major part of a gas line extending from the Monroe, La., field to Birmingham and Atlanta for the Southern Natural Gas Co. The Milwaukee maker is said to have taken slightly less than half of this tonnage, while the remainder was divided among the Steel Corporation subsidiary and the two independent makers of this size of lapwelded pipe. Prospects for a better demand from the oil country are more encouraging, but signs of definite improvement are lacking. No slackening in the demand for mechanical tubing and boiler tubes is reported.

Sheets.—Sheet operations were at a somewhat better rate last week than in the previous week, and, while specifications are scarcely equal to those of April, they are running close to productive capacity. Deliveries are still being extended on some gages and grades and now run from six to eight weeks on blue annealed, with only slightly better shipments possible on black and galvanized. Large consumers, now beginning to plan for their requirements in the early weeks of the third quarter, are showing considerable interest in prices for that period, and, although there is considerable talk of advances of $1 to $2 a ton, no announcement has yet been made. Some makers of automobile body sheets are quoting this grade for third quarter at 4.20c., Pittsburgh, an advance of $2 over the present quotation, but this price has not been generally adopted. The recent advance on metal furniture sheets will apply on third quarter contracts.

Tin Plate.—Tin plate business continues to fulfill expectations of a record year. The large container manufacturers have generally over-specified their first half contracts by comfortable margins. Reports on crop conditions from various parts of the country are largely favorable. The leading interest operated its mills last week at about 97 per cent of capacity, a slight decline from the previous week, but a fluctuation to be expected when mills are running at practical physical capacity. Independents are likewise pushing their facilities to the limit.

Cold-Finished Steel Bars.—Specifications are satisfactory, but are still somewhat below the present rate of operations. As a result, mills are in a better position to make deliveries than they were a month ago and are also having less difficulty in securing an adequate supply of bars from the hot mills for cold rolling. New orders are being taken at a steady rate and the automobile industry is freely placing its requirements for June. Slight curtailments in the operating rate at some of the Michigan plants are offset by increases at others, and the aggregate tonnage going to that industry shows no falling off. The price is steady at 2.30c., Pittsburgh.

Old Material.—The scrap market declined further in the last week, and No. 1 heavy melting steel is now quotable at 50c. under recent levels. A large sale of this grade has been made at slightly more than $17.50, delivered to a consumer in this district, and, although another sale was reported at as high as $18.25, the market leans toward the lower figure. Dealers are picking up this grade of scrap at $17.25 and the market has a weaker tone from the standpoint of both the consumer and the dealer. Heavy melting steel on the Pennsylvania Railroad list is said to have brought about $18.50, but this premium was to be expected in view of past transactions and is not representative of the market on regular No. 1 steel. Declines have also been registered in several other classifications of scrap, several of the open-hearth grades having been reduced about 50c. a ton. Axle turnings are off 25c. and a similar decrease has occurred on compressed sheets. Scrap is plentiful in the district and mills are somewhat exacting in their requirements. In some cases, users are well covered for the remainder of the quarter and are not yet disposed to commit themselves for the second half.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.25 to $18.25
No. 2 heavy melting steel	15.50 to 16.00
Scrap rails	17.25 to 17.75
Compressed sheet steel	17.50 to 18.00
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.75 to 19.25
Heavy breakable cast	13.00 to 13.75
No. 2 railroad wrought	17.75 to 18.25
Hvy. steel axle turnings	15.75 to 16.75
Machine shop turnings	10.75 to 11.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	22.50 to 23.00
Low phos., mill plates	22.50 to 23.00
Low phos., light grades	20.00 to 21.00
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	15.75 to 16.75
Electric Furnace Grades:	
Low phos., punchings	19.50 to 20.50
Hvy. steel axle turnings	15.75 to 16.75
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.50
Short mixed borings and turnings	11.50 to 12.50
Cast iron borings	11.50 to 12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.50 to 20.50

Hot-Rolled Strip. — Specifications this month are only slightly ahead of those of April, and with mill operations at the recent high rate, backlogs are being steadily reduced. Deliveries now average somewhat less than four weeks. New orders are rather encouraging, and consumers are showing interest in their third quarter requirements. Prices for that period have not yet been announced, but an advance is contemplated in view of the probable higher quotations on semi-finished steel.

Cold-Rolled Strip.—Delivery promises on cold-rolled strip steel are somewhat more extended than on the hot-rolled product, but this is because of the additional time required for rolling and not on account of heavier tonnage on company books. Specifications are holding to the recent levels and are somewhat smaller than shipments. Prices are well established at 2.75c. to 2.85c., Pittsburgh or Cleveland.

Coke and Coal.—The continued high operating rate in the steel industry has given the coke market a somewhat stronger sentiment, and, although this is not reflected in asking prices for the furnace grade, the general situation is somewhat improved. The market is still quotable at 2.75c. to 2.85c., Connellsville, for standard furnace coke, and concessions from the minimum price are less frequent. Specifications for foundry coke are dragging slightly and the market is rather sluggish. Little if any spot business is being placed. The coal market is unchanged, with prices badly demoralized.

Advises Jobbers to Develop Mutual Confidence

Discussing the steel pipe situation at the convention of the National Pipe and Supplies Association, which is being held in Pittsburgh this week, C. F. Cruciger, vice-president in charge of sales, Spang, Chalfant & Co., Pittsburgh, expressed the belief that the lot of pipe jobbers would be much more satisfactory if they had more confidence in each other and were less prone to invade territories that involve long-distance hauls.

He thought it a better plan for those who are disposed to seek business well outside the areas that can be easily supplied to establish branch warehouses in those areas and thereby eliminate the needless expense of long hauls.

H. F. Mattern, general manager of sales, Reading Iron Co., Reading, Pa., thought the outlook for the next few years for wrought iron pipe was bright. He emphasized that makers of that product no longer regard themselves as competitors of steel pipe manufacturers, but that each kind has its distinct field. The jobber, he said, has a place in the distribution of pipe and will continue to have one, since, in spite of frequent assertions to the contrary, no plan yet has been devised to replace the service and the facilities now provided the consumer by the jobber.

Due to the constantly increasing volume of business in the Pittsburgh district, the Pittsburgh office of the Brown Instrument Co. has moved to larger quarters. It is now at 1522 Oliver Building, with increased facilities for handling the business.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$36.00
Rerolling, 4 in. and under 10 in., Youngstown	36.00
Rerolling, 4 in. and under 10 in., Cleveland	36.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$36.00
Youngstown	36.00
Cleveland	36.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$36.00
Youngstown	36.00
Cleveland	36.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.00

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75 to $2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	$1.35
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to $18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to an including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Mills Heavily Scheduled to Midsummer—Specifications Smaller But Are Equal to Shipments

CHICAGO, May 14.—Steel production in the Chicago district remains at capacity, and mills are heavily scheduled to midsummer. The opening of the last half of the second quarter finds new buying much diminished, but specifications, though smaller in total volume than a week ago, still match well with shipments. Buyers are showing greater interest in third quarter requirements. Sellers' books are not officially open for that period except in the case of one producer of sheets. Much tonnage ordered in the current quarter will be delivered after July 1 because of heavy mill schedules and the inability of sellers to meet buyers' needs as they arise. Heavy order books may be an influence that will lead producers to open third quarter books earlier than is customary.

Lessened pressure from the viewpoint of specifications has brought a halt in the extension of deliveries. Local mills are scheduled for 14 weeks in plates, 12 to 14 weeks in bars and six to eight weeks in structural shapes. The lessened rate of specifying appears not to be a reflection of slower industrial activity, but rather an indication that the bulk of second quarter contracts have been ordered out in full.

Farm implement and tractor manufacturers are producing at capacity, and specifications from car builders lead to the impression that they have reached peak production. Reports received here foretell a lessened volume of medium-priced automobile output. Changes of models is an influence pointing to a reduced steel demand from this source. A favorable factor in the automobile industry is the growth of export business, which some believe will decidedly tend to fill the valley in the summer output curve.

Prices for plates, shapes and bars show added strength. A local sheet producer has opened third quarter books. Current base prices for galvanized and black sheets are being retained, and the blue annealed product has been divided into two groups, with a base price for each. New cards of extras result in price advances on gages from No. 12 to No. 16, inclusive.

Pig Iron.—Daily shipments of Northern iron so far in May are equal to the average in April, and there is no indication of a lessening in the rate of melt in this district. Spot purchases are above normal for this time of year, especially in view of the heavy sales made for delivery in the current quarter. Consumers still show interest in iron for use after July 1. A user in western Michigan is in the market for 1800 tons for delivery in the last half. Spot sales of charcoal iron are in fair number. Southern iron is quiet.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$21.01 to 21.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—A cargo of English spiegeleisen is scheduled to arrive at Chicago at an early date. The local market is quiet. Prices are unchanged at $34 a ton, Hazard, Pa., for carload orders.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—New business is dragging, though specifications easily match current shipments. Deliveries remain at 14 weeks. A Southern oil producer has closed for 5000 tons of plates for storage tanks, and inquiry now before the trade is in excess of 20,000 tons, the bulk of which is for delivery in the Southwest. Specifications are heavy from car builders. It is reported that the Chicago & North Western has temporarily set aside the purchase of 1000 to 2500 box cars. Prices of plates are firm.

Structural Material.—Both awards and fresh inquiry reflect a better situation in this market. Shop operations are steady, but backlogs are small. More liberal awards are needed if the present rate of output is to be sustained. The Patterson Estate Building has been revived. Additional property has been acquired on Wacker Drive, Chicago, and the steel required will be close to 5000 tons, or about double the amount previously estimated. It now seems that all obstacles have been cleared for the Outer Drive bridge across the Chicago River. This is a $10,000,000 project.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Hot-Rolled Strip.—Prices for this commodity are firm. Specifications are fully equal to shipments and output is at mill capacity.

Bars.—A halt has come in new buying of mild steel bars and current specifications have dropped to a level which about balances with shipments. This is the first time in weeks that deliveries have not been extended. Prices are firm at 2.05c. to 2.15c., Chicago. Forgers in this district are operating at capacity and farm implement manufacturers do not hesitate to take steel at an unchanged rate. Demand is lighter from automobile manufacturers of medium-priced cars. Prices of iron bars are steady and shipments are in good volume. Demand for alloy steel bars is little changed from the previous week. Spot sales are more numerous. Both specifications and production of rail steel bars during the first two weeks in May are ahead of the last half of April. Barn equipment makers are taking liberal quantities. The demand for hard steel reinforcing bars is expanding.

Wire Products.—May shipments of wire and wire products are averaging well up to a year ago at this time, though there is a reduction from the rate maintained in March and April of this year. Specifications for woven wire fencing and nails are a trifle heavier, but as a general thing the jobbing trade is sluggish. Demand for manufacturers' wire is less active. It is noteworthy that automobile manufacturers are making releases at closer range. Prices are steady, except on nails in and around Louisville, Ky. Unseasonable weather is given as one of the troubles confronting the country trade. In many localities excessive rain has left the ground too wet to work, but the feeling is generally expressed that if weather conditions improve in the next week or two the outlook will be favorable for a large crop year.

Cold-Rolled Strip.—Prices are strong. As producers are fully committed to the end of the quarter, it is thought by some that third quarter prices will soon be named.

Cast Iron Pipe.—This commodity continues slow in the immediate Chicago district. Few contractors have work on hand, and, as far as can be learned, few heavy tonnage projects are taking shape. Subdivision work is at a standstill, whereas a year ago it required heavy tonnages of cast iron pipe. Delivered prices for 6-in. and larger diameters remain steady at $44.20 to $46.20 a ton. It is reported here that Detroit has awarded 500 tons of 6-in. pipe to the American Cast Iron Pipe Co. and 1700 tons of 6-in. and 1100 tons of 16-in. to the United States Pipe & Foundry Co. A contractor has taken 150 tons of 6 to 12-in. pipe for Rochelle, Ill. Miamisburg, Ohio, has closed for 115 tons of 4 to 8-in. pipe with the Central Foundry Co. Wellsville, Mo., will buy 400 tons through a general contractor. The McWane Cast Iron Pipe Co. is low bidder on a round tonnage at Saint Clair Shores, Mich., and the Glamorgan Pipe & Foundry Co. is low on 770 tons of 24-in. pipe for Chicago, which asked for quotations to include a trucking charge for delivery at the trench site. Among new inquiries are 100 tons of 6-in. for Plainview, Ill.; 150 tons of 4 to 8-in. for Mozart, Mo.; 500 tons of 6 to 12-in. pipe for Blue Island, Ill., and 800 tons for Franklin County, Ohio.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $44.20 to $46.20; 4-in., $48.20 to $50.20; Class A and gas pipe, $3 extra.

Reinforcing Bars.—Prices for billet steel reinforcing bars are giving ground as competition waxes unusually keen in a dull market. Concessions made heretofore were confined to attractive tonnages, but recently

as much as $6 a ton has been offered as an inducement on lots in the range of 100 to 150 tons. Quotations on the rail steel commodity are not strong. Awards of large tonnages are lacking but small purchases, of less than a carload each, are fairly numerous.

Rails and Track Supplies.—This market is quiet except for scattered orders for track fastenings, the aggregate of purchases having been close to 3000 tons. Users have entered orders for a few carloads of light rails. Rail mill output is being held down by the lack of semi-finished steel. Railroads are exerting heavy pressure for larger shipments.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Coke. — Demand for by-product foundry coke is steady and all ovens are lighted. Spot business is quiet.

Bolts, Nuts and Rivets.—Specifications show little change in the week, and output remains close to 75 per cent of capacity. Prices are steady. Sellers plan to prepare third quarter contracts about June 1.

Old Material.—This market is holding moderately steady, though there are some signs that point to weakness, especially in the heavy tonnage grades. Opinion in the trade is mixed as to the trend. It is significant that rejections at mills are unusually high. This is attributed to the fact that this is the time of the year when winter accumulations of scrap are quickly prepared and rushed on the market. The result is that considerable of such scrap does not meet specifications. It is quite apparent that the supply of good quality scrap is scarcely adequate for current demands. Brokers are more interested in covering old orders than in making new commitments. A consumer has bought 500 tons of strictly No. 1 heavy melting steel at $15.75 a gross ton, delivered. Steel couplers and coil springs have sold off 50c. a ton in the week, and steel angle bars have been bought by a melter at $17.75 a gross ton, delivered. Some weakness has developed in prices for railroad malleable, supplies of which are freer, and most consumers are more comfortably covered on immediate and near-future needs.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$15.50 to	$16.00
Shoveling steel	15.50 to	16.00
Frogs, switches and guards, cut apart, and misc. rails	17.00 to	17.50
Hydraul. compressed sheets	13.75 to	14.25
Drop forge flashings	11.00 to	11.50
Forg'd cast and r'l'd steel carwheels	19.00 to	19.50
Railroad tires, charg. box size	19.00 to	19.50
Railroad leaf springs cut apart	19.00 to	19.50
Acid Open-Hearth Grades:		
Steel couplers and knuckles	17.00 to	17.50
Coil springs	19.50 to	20.00
Electric Furnace Grades:		
Axle turnings	16.25 to	16.75
Low phos. punchings	18.00 to	18.50
Low phos. plates, 12 in. and under	17.00 to	17.50
Blast Furnace Grades:		
Axle turnings	11.25 to	11.75
Cast iron borings	10.25 to	10.75
Short shoveling turnings	10.25 to	10.75
Machine shop turnings	7.50 to	8.00
Rolling Mill Grades:		
Iron rails	16.00 to	16.50
Rerolling rails	17.50 to	18.00
Cupola Grades:		
Steel rails less than 3 ft.	18.50 to	19.00
Steel rails less than 2 ft.	19.50 to	20.00
Angle bars, steel	17.25 to	17.75
Cast iron carwheels	14.50 to	15.00
Malleable Grades:		
Railroad	18.75 to	19.25
Agricultural	15.75 to	16.25
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angles and splice bars	15.00 to	15.50
Iron arch bars and transoms	21.50 to	22.00
Iron car axles	27.00 to	27.50
Steel car axles	17.00 to	17.50
No. 1 railroad wrought	14.25 to	14.75
No. 2 railroad wrought	13.75 to	14.25
No. 1 busheling	12.00 to	12.50
No. 2 busheling	7.00 to	7.50
Locomotive tires, smooth	14.50 to	15.00
Pipes and flues	10.00 to	10.50
Cupola Grades:		
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	15.00 to	15.50
No. 1 agricultural cast	14.00 to	14.50
Stove plate	12.75 to	13.25
Grate bars	13.00 to	13.50
Brake shoes	12.00 to	12.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—The Inland Steel Co. has opened books for third quarter delivery and in so doing has set two bases for pricing blue annealed sheets. Quotations on black sheets will be 3.05c. a lb., Indiana Harbor, and on galvanized sheets 3.80c. These are unchanged from current quotations. The blue annealed product has been divided into two classifications, namely, light plates, for which the base price is 2.30c. a lb. for Nos. 9 and 10 gage, and blue annealed sheets, which are based on No. 13 gage at 2.45c. The net result is that prices for Nos. 8, 9, 10 and 11 are unchanged. New differentials result in advances of 5c. a 100 lb. on Nos. 12, 13 and 15 gages and 10c. a 100 lb. on Nos. 14 and 16 gages. New buying in sheets is in moderate volume. Current specifications are fully equal to shipments, which approximate 80 per cent of hot mill capacity. The available supply of raw steel is still the deciding factor in determining output of sheet mills. Deliveries range from three to six weeks, depending on the grade.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.40c.
Reinforc'g bars, rail steel	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ¼ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Algoma Steel Corporation Plans Large Expansion

TORONTO, ONT., May 14.—The Lake Superior Corporation has made the following announcement:

"The Algoma Steel Corporation has authorized important extensions and improvements to its plant located at Sault Ste. Marie, Ont. Both the merchant mills are to be extended so as to double their capacity in bars and structural shapes. When the extensions are completed the mills will be adapted to the needs of the automobile trade and will be the first mill in Canada designed to roll alloy steels. The extensions and improvements referred to will mean the production of certain structural sections not now manufactured in Canada, but used by the different fabricators. Such increased production has been found necessary on account of the activities of the various bridge companies in particular and will very materially reduce importations of such materials from the United States. In addition to the mill development program, improvements have been authorized necessitating large expenditure on the blast furnaces and open hearth departments. The mill extensions will increase the production of structural shapes from 7500 tons per month, present capacity, to 15,000 tons per month."

Commonwealth Steel Co. to Go Into Merger

Final negotiations for the merger of the Commonwealth Steel Co., Granite City, Ill., with the General Steel Castings Corporation, Philadelphia, are under way, following approval of the plans by the latter company. The General Steel Castings Corporation was recently organized by the American and Baldwin locomotive companies and the American Steel Foundries to build a plant near Philadelphia for making large steel castings.

The consolidation of the Commonwealth company with the General Steel Castings Corporation, according to a statement by Clarence H. Howard, president of the Granite City company, "will mean cooperation in all matters and in a better serving of the entire country with devices for the railroads and other customers. . . . The new No. 9 building (of the Commonwealth company) will be made 600 ft. long instead of 400 ft.; 200 ft. will be added to the core room building; 200 ft. to the core oven building to make room for more core ovens, and No. 4 building will be improved and its leanto extended."

New York

Pig Iron Sold for Deliveries Extending Into Third Quarter —New Pipe Line Project Announced

NEW YORK, May 14.—Pig iron bookings in the past week totaled about 13,000 tons, including one sale of close to 8000 tons calling for deliveries extending into the third quarter. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 1000 tons, but otherwise inquiries are confined to relatively small lots. Pig iron prices are more flexible, and buyers believe that better than $18, base Buffalo, can be done on a desirable tonnage. In some cases producers are able to obtain more satisfactory prices at furnace by selling for shipment by water or by water and rail. The pig iron movement by barge, which was delayed by high water in the State canal, has finally got under way. Although the tariff bill provides for no increase in the duty on pig iron, there are no signs of greater activity in foreign metal. Royal Dutch and Indian foundry iron continue to be sold in moderate lots, but at delivered prices that are ordinarily higher than those available on domestic brands. A downward revision of water and rail rates from Alabama has revived interest in Southern iron. On June 15, combination rates from Birmingham by rail to Savannah, Ga., and from there by steamship will be as follows: $5 a ton to Baltimore, $5.25 to Philadelphia, $5.45 to New York and $5.75 to Providence and Boston. The rates do not include dock and handling charges or the cost of lighterage. A rate of $3.50 a ton is available on rail shipments from Birmingham to Norfolk, Va., on iron to be shipped northward by barge. Transfer to barges will cost 39c. a ton, and rates for the water haul are subject to negotiation. While the new rates are not likely to make it possible to lay down Alabama iron in this section at delivered prices as low as those from nearby furnaces, the margin will be materially reduced and larger sales for mixture purposes are looked for. One broker plans to move a bargeload of Alabama iron to Bridgeport, Conn.

Prices per gross ton, delivered New York district:

Buffalo No. 2, fdy., sil. 1.75 to 2.25	$22.91 to $23.91
*Buf. No. 2, del'd east. N. J.	21.28 to 22.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—Sales of about 500 tons of ferromanganese are noted, principally for delivery in the last half. There have also been orders for carloads and small lots for early delivery. Demand for spiegeleisen for spot delivery has been more active, and contracts for the last half are beginning to be negotiated, some having been put through. Prices for both products are unchanged for any delivery. Specifications on contracts are heavy.

Reinforcing Bars.—Reported lettings of 100 tons or more total 2500 tons. Considerable tonnage is being booked for school buildings, highways, sewers and other public work. The local building trades lockout, if it materializes, will adversely affect concrete bar business, although it will not interrupt municipal work.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—A gas pipe line to be built from Monroe, La., to Shreveport, La., about 100 miles, by the Arkansas Natural Gas Corporation, a subsidiary of the Cities Service Co., will take about 16,000 to 18,000 tons of 20-in. pipe. Buying will be done at the New York office of the company. New business in structural material continues in excess of output, according to the leading Eastern producer. In other products new orders are infrequent, but the volume of shipments on contracts to consumers and distributers in this district shows no signs of falling off.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Most jobbers report moderately active demand, but May is not expected to be a better month than April, unless business improves considerably in the next two weeks. Occasional concessions are still being made on black and galvanized sheets and structural material.

Cast Iron Pipe.—Most of the current business in gas and water pipe is in lots of less than 100 tons. On recent public bids, Northern makers have quoted delivered prices figuring back to $31 to $33 per ton, f.o.b. foundry. On about 1600 tons of 42-in. water pipe for Syracuse, N. Y., R. D. Wood & Co. were the low bidders. Albany, N. Y., has awarded 39,000 tons of 42-in. and 48-in. water pipe to the United States Pipe & Foundry Co. New York City has opened bids on 100 tons of 16-in. water pipe for the borough of Queens. Washington has taken bids on 150 tons of pipe and 30 tons of fittings.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $35.60 to $36.60; 4-in. and 5-in., $38.60 to $39.60; 3-in., $45.60 to $46.60. Class A and gas pipe, $3 extra.

Coke.—Demand is light and standard furnace coke is unchanged at $2.75 to $2.85 per net ton, ovens. Foundry grade ranges from $3.50 to $3.75 per net ton, ovens. By-product foundry coke demand is good and prices are unchanged. Special brands of beehive coke continue at $4.85 per net ton, ovens, or $8.56, delivered to northern New Jersey, Jersey City and Newark and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—No. 1 heavy melting steel is still being bought at $16 to $16.50 per ton, delivered eastern

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Pennsylvania, although a small tonnage was closed last week at $16.50 per ton, delivered. Yard grade of heavy melting steel is quoted at $12, delivered Pottsville, Pa., and $12.50 per ton, delivered Phoenixville, Pa. No. 2 heavy melting steel is being bought at $13.50 to $13.75 per ton, delivered eastern Pennsylvania. For heavy breakable cast brokers are paying $15, delivered, on the basis of sales at $15.50, the highest price recently paid by consumers of this grade. There is a continued undertone of weakness in prices.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$13.00 to $13.50
Heavy melting steel (yard)	8.25 to 9.25
No. 1 hvy. breakable cast.	11.25 to 12.25
Stove plate (steel works).	8.50 to 8.75
Locomotive grate bars....	8.75 to 9.00
Machine shop turnings....	7.75 to 8.00
Short shoveling turnings..	7.75 to 8.00
Cast borings (blast furn. or steel works).....	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.00
Steel car axles.....	19.25 to 19.75
Iron car axles.....	25.00 to 26.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.75
Forge fire	10.00 to 10.50
No. 1 railroad wrought...	12.50 to 13.00
No. 1 yard wrought, long..	11.50 to 12.00
Rails for rolling.....	13.50 to 14.00
Cast iron carwheels.....	12.00 to 12.25
Stove plate (foundry)....	9.00 to 9.50
Malleable cast (railroad).	14.00 to 14.50
Cast borings (chemical)..	10.50 to 11.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Eastern Rolling Mill Co., Baltimore, reports net profit for the first quarter of $265,872 after taxes, depreciation, etc., equivalent to $1.13 on 234,370 shares of common stock. Profits in the December quarter were $227,699, or $1.02 on each of the 223,160 shares then outstanding.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb
Plates, ¼-in. and heavier.....	2.70c
Plates, ⅜-in.	2.90c
Structural shapes	2.70c
Soft steel bars, small shapes, iron bars (except bands).....	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.....	4.30c
Reinforc. steel bars, sq. twisted and deform. .....2.60c. to	2.80c.
Cold-fin. steel, rounds and hex.....	3.60c.
Cold-fin. steel, sq. and flats.....	4.10c.
Steel hoops	3.40c.
Steel bands, No. 12 to ⅛-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24).....	4.10c.
†Galvanized sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.25c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

New Steel Business Smaller But Operating Rates Are High —Third Quarter Sheet Prices Announced

PHILADELPHIA, May 14.—Steel mills continue a high rate of operation under the momentum of good tonnages booked earlier in the quarter. With some mills orders are sufficient for operation well into July. Deliveries are still extended, with three and four weeks usual on plates and bars and a minimum of about four weeks on sheets. One maker of blue annealed, black and galvanized sheets has announced the present prices for third quarter contracts.

Pig Iron.—Activity is limited to carload lots of foundry iron, on which $21.50, base furnace, is maintained. No sizable tonnage has developed to test the strength of this price. Recent inquiries for foundry iron have in some cases specified delivery beginning in this quarter and extending into July or August, the buyers evidently having underestimated their requirements in their original second quarter contracts. Demand for low phosphorus is small.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil. .....$21.76 to	$22.26
East. Pa. No. 2X, 2.25 to 2.75 sil. ..... 22.26 to	22.76
East. Pa. No. 1X..... 22.76 to	23.26
Basic (del'd east. Pa.).... 20.25 to	21.00
Gray forge ..... 20.50 to	21.00
Malleable ..... 21.25 to	21.75
Stand. low phos. (f.o.b. N. Y. State furnace)... 22.00 to	23.00
Cop. b'r'g low phos. (f.o.b. furnace) ..... 23.50 to	24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.79
Va. No. 2X, 2.25 to 2.75 sil.	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Only occasional small orders for billets are being placed, but shipments on contracts are in good volume. Prices are firm at $36 per ton, Pittsburgh, for rerolling grade and $41, Pittsburgh, for forging quality.

Bars.—Mills are still well booked. Deliveries are extended, and only on certain sizes can buyers obtain shipments in less than four weeks. Prices are firm at 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia.

Reinforcing Bars.—The only sizable award in the past week was 1600 tons of billet steel reinforcing bars to the Concrete Steel Co. for the Olney High School, Philadelphia. Billet steel reinforcing bars in 40, 50 and 60-ft. lengths are quoted at 2.05c., Pittsburgh, or 2.37c., Philadelphia, with a $5 extra for cutting to length. Competition for tonnage is keen and on desirable business eastern Pennsylvania sellers have quoted billet steel bars at 1.95c., Pittsburgh, and the $5 cutting extra. Rail steel bars are 1.95c., f.o.b. Franklin, Pa., or Tonawanda, N. Y., cut to required length, or 2.27c., delivered Philadelphia.

Plates.—Deliveries are about four weeks, and on certain sizes mills are unable to promise earlier than five weeks. Substantial tonnages have been booked for delivery to the railroads and car builders and some good business is in prospect from shipbuilders with recently awarded contracts. Prices are firm at 2.05c., Coatesville, Pa., or 2.15c., delivered Philadelphia.

Shapes.—Fabricated steel projects have not been numerous in the past week or more, and fabricated prices are still at a low level. Mills continue to quote shapes at 1.95c. to 2c., f.o.b. nearest mill to consumer, or on a basis of Pencoyd, Pa., 2.01c. to 2.06c. per lb., delivered Philadelphia. Occasionally a concession from these prices is made on desirable business. Deliveries from eastern Pennsylvania mills range from one to three weeks on most specifications.

Sheets.—Slightly earlier deliveries are being offered by mills which have had a substantial tonnage of automobile body stock on their books. Prices are being maintained with more firmness than earlier in the quarter, but concessions have not entirely disappeared. Galvanized sheets are quoted at 3.70c., Pittsburgh, or 4.02c., delivered Philadelphia, and black at 2.95c., Pittsburgh, or 3.27c., delivered Philadelphia. These quotations are announced by one mill as applying to third quarter contracts. Blue annealed sheets range from 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., delivered Philadelphia, depending upon the width. Concessions from the base price of 2.20c. per lb., for wide sheets are obtained on occasion, especially when an order includes both narrow and wide sheets.

Imports.—In the week ended May 11, 1000 tons of pig iron arrived at this port from the United Kingdom and 500 tons of manganese ore from Java. Steel imports consisted of 54 tons of steel scrap from Germany and three tons from the United Kingdom, 69 tons of bars from Germany and one ton of strip steel from Switzerland.

Old Material.—Lack of consumer buying is reflected in the prices of most grades of scrap. No. 1 heavy melting steel is inactive, except for a purchase of a small lot last week by a Pencoyd, Pa., consumer at $16.50 per ton, delivered. This price evidently represents the level at which brokers would be willing to sell a moderate tonnage to eastern Pennsylvania consumers. Stove plate is not quotable at more than $13 per ton on the basis of recent transactions, and $15.50 per ton represents the market on heavy breakable cast, although $16 per ton has been paid in one instance for a good grade of this material. Under the recommended duty to be applied on tungsten and

tungsten bearing steels, dealers who have been buying a substantial tonnage of high-speed steel scrap from Great Britain and Germany are of the opinion that application of the duty will prohibit further importation.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel		$16.50
Scrap T rails		16.00
No. 2 heavy melting steel	$13.50 to	14.25
No. 1 railroad wrought	16.00 to	16.50
Bundled sheets (for steel works)		11.50
Hydraulic compressed, new	14.50 to	15.50
Hydraulic compressed, old	12.00 to	12.50
Machine shop turnings (for steel works)	11.50 to	12.00
Heavy axle turnings (or equiv.)	14.50 to	15.00
Cast borings (for steel works and roll. mill)	11.00 to	11.50
Heavy breakable cast (for steel works)	15.50 to	16.00
Railroad grate bars	13.00 to	13.50
Stove plate (for steel works)	13.00 to	13.50
No. 1 low phos., hvy., 0.04% and under	22.00 to	23.00
Couplers and knuckles	20.00 to	21.00
Rolled steel wheels	20.00 to	21.00
No. 1 blast f'nace scrap	10.50 to	11.00
Wrot. iron and soft steel pipes and tubes (new specific.)		15.50
Shafting	19.00 to	19.50
Steel axles	23.00 to	23.50
No. 1 forge fire		14.00
Cast iron carwheels		16.50
No. 1 cast	16.50 to	17.00
Cast borings (for chem. plant)		15.00
Steel rails for rolling	16.50 to	17.00

General Refractories Co., Philadelphia, and Harbison-Walker Refractories Co., Pittsburgh, have secured from Inland-Stuart Linings, Inc., Koppers Building, Pittsburgh, license to manufacture and sell the Inland-Stuart patented blast furnace lining, whereby all brick joints are broken both vertically and in the horizontal courses. Several stacks lined with the Inland-Stuart bond have been in successful operation since 1925.

United Feldspar Corporation, recently organized by officials of United States Feldspar Co., 39 Broadway, New York, with properties at Cranberry Creek, N. Y., has acquired plants and properties of Oxford Mining & Milling Co., and Crystal Spar Feldspar Quarries, both of West Paris, Me., and will consolidate with organization. Purchasing company will also take over Tennessee Mineral Products Co., with feldspar mines and mill at Spruce Pine, N. C. An expansion program will be carried out.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands, No. 12 to $\frac{1}{8}$ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.25c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb	$2.95
No. 9 gal. wire, per 100 lb	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

Cleveland

Demand for Automobile Body Sheets Slows Down—Otherwise Steel Business Holds to Recent Volume

CLEVELAND, May 14.—Specifications for steel bars, plates and structural material appear to be holding up to the recent heavy volume, the tonnage entered so far this month being about the same as during the corresponding period of April. The demand for automobile body sheets has slowed down considerably and better deliveries are now being promised on this material. This reflects a curtailment in the automotive industry. While several motor car manufacturers are cutting down production to bring out new models, others, including leading makers of low-priced cars, expect to continue through June at present schedules. The demand for hot and cold-rolled strip and alloy steel has also declined somewhat because of the decreased orders from the automotive industry, but sheets, aside from full finished, show little falling off, as the consumption by some industries outside of the automotive field has increased recently.

Some interest is now being shown in third quarter prices. There is no talk of an advance on steel bars, plates and structural shapes, and the belief is rather general that this quarter's prices will be reestablished on those products. It is expected that present prices on black and galvanized sheets will be reestablished for the third quarter and made the minimum prices for that delivery. New prices on blue annealed sheets under a reclassification plan will represent an advance.

There is little new business in any line of finished products, as most consumers are covered by contracts. A few inquiries have come from the motor car industry for third quarter contracts, but mills have declined to quote. Plates are moving well to manufacturers of small tanks, and manufacturing plants are specifying freely for structural material. A lull in the building field continues both in inquiry and awards. Reinforcing bars are dull.

Prices are unchanged at 1.95c. to 2c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and structural material.

Iron Ore.—Movement of Lake Superior ore from lower Lake docks continues heavy. Shipments during April were 1,676,656 tons, as compared with 397,246 tons during the corresponding month last year, according to the monthly report of the Lake Superior Iron Ore Association. The balance on Lake Erie docks May 1 was 3,646,546 tons, as compared with 5,182,388 tons on the same date a year ago.

Pig Iron.—Buying has tapered off somewhat, but shipments are holding up to recent heavy volume. Foundries are as yet taking little interest in third quarter contracts, although inquiry for that delivery has increased slightly. Among third quarter inquiries for foundry iron are two from Dayton, Ohio, one for 2000 tons and one for 1000 tons. Sales of foundry and malleable iron by Cleveland interests during the week amounted to 13,700 tons. A Cleveland interest also sold 10,000 tons of basic iron at $18.50 for shipment from a Valley furnace to a northern Ohio steel maker. This follows a 20,000-ton sale at the same price previously reported and appears to definitely establish the market at the 50c. a ton advance. Prices on foundry and malleable iron are unchanged. Cleveland furnaces are getting $19 at furnace for local delivery and $18.50 for out-of-town shipment. Another Lake furnace producer is quoting $19 for western Ohio and Indiana shipment. In Michigan, there is still a price range of $20 to $20.50.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25		$19.50
S'th'n fdy., 1.75 to 2.25	$21.00 to	21.50
Malleable		19.50
Ohio silvery, 8 per cent		29.00
Basic Valley furnace		18.50
Stand. low phos., Valley	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates; 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-finished Steel.—While some of the sheet mills are not getting sheet bars as fast as wanted and are pressing for shipments, deliveries by the leading local producer have improved slightly, although this producer has specifications covering its full output for nearly four weeks. These specifications are all against second quarter contracts.

Sheets.—A new classification of blue annealed sheets has been brought out and it probably will be generally adopted. No. 12 and heavier are to be designated at light plates and No. 13 and lighter as blue annealed sheets. Nos. 9 and 10 are to be the base for the former and No. 13 for the latter, with 2.20c. and 2.35c., Pittsburgh, respectively as the base prices. These prices are to be named for the third quarter and represent an advance of $1 a ton over the present blue annealed base and about $2 a ton above what has been the rather common continuous mill price on blue annealed sheets. The change will doubtless prove beneficial to makers of the blue annealed sheets that are rolled in wide sizes on jobbing mills. Manufacturers of these sheets contend that the price of their product should not be affected by the competition of continuous mills. While Ohio mills have made no price announcement for the third quarter, it is expected that the present prices of 2.95c. on black and 3.70c. on gal-

vanized will be reestablished, and efforts will be made to maintain those as minimum prices. Considerable tonnage was taken during the quarter at a $2 a ton concession from these prices and these concessions are still in evidence. The demand is holding close to recent volume except for auto body sheets.

Strip Steel.—Orders for both hot and cold-rolled strip show a decrease. Although deliveries have improved, mills still have a good backlog of orders and a local mill is filled up on wide cold-rolled strip until July. No announcement has been made regarding third quarter prices. For current orders, the market is firm at regular quotations.

Cold-Finished Steel Bars.—Specifications show some gain, indicating that many consumers have about used up the lower-priced steel they were receiving last month against first quarter contracts and which resulted in a lull in orders during April. Production is hampered somewhat by slow deliveries of hot-rolled bars. The market is firm at 2.35c., Cleveland.

Wire Products.—Wire and fence are moving well and nails are in fair demand. Wire business has been stimulated by the seasonal demand for wire for road-building. Prices are being well maintained.

Warehouse Business.—The demand is good for practically all products, the volume of business being about the same as during April.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues very good, manufacturers getting liberal specifications from motor car manufacturers, other consumers, and from jobbers. Prices are firm. Rivet specifications are satisfactory.

Coke.—Foundries in this territory continue in good operation and are taking coke freely on contract. There is a moderate amount of new business. The light demand for by-product coke for domestic use is permitting producers to accumulate stocks. Prices are unchanged. Ohio by-product foundry coke is quoted at $8.25, Painesville.

Old Material.—Considerable steel making scrap is being shipped to Cleveland by boat, and one of the mills has taken very little local scrap since it has been receiving water shipments. This is having a depressing effect on the Cleveland market. Dealers are not making much of an effort to buy or sell steel making scrap locally because of their inability to move it. No. 1 heavy melting steel scrap is in fair demand in the Valley district, and the supply of the grade taken by Valley mills is not plentiful. Dealers are paying $17.75 to $18 for steel making scrap for Valley shipment. Blast furnace scrap is moving well. Dealers are paying $11.25 for this grade to fill outstanding orders. Quotations are unchanged, but in the absence of transactions some of the prices are regarded as nominal.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.50 to $16.00
No. 2 heavy melting steel	15.00 to 15.50
Compressed sheet steel	15.00 to 15.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	12.50 to 13.00
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops	18.50 to 19.00
Low phos., billet, bloom and slab crops	18.50 to 19.00
Low phos. sheet bar crops	18.00 to 18.50
Low phos. plate scrap	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings	11.25 to 11.50
Mixed borings and short turnings	11.25 to 11.50
No. 2 busheling	11.25 to 11.50
Cupola Grades	
No. 1 cast	17.25 to 17.50
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

Reinforcing Steel

Awards of 10,000 Tons Larger Than for Some Weeks—New Projects 4000 Tons

AWARDS of about 10,000 tons make the largest total in some weeks. Outstanding contracts were 2000 tons for a building in Seattle, Wash., and 1600 tons for a high school in Philadelphia. New projects of about 4000 tons include 2550 tons for the Cushman Dam at Tacoma, Wash., and 800 tons for an apartment building in Chicago. Awards follow:

NEW YORK, 800 tons, warehouse in Whitlock Avenue for Sachs Quality Furniture, Inc., to Jones & Laughlin Steel Corporation.

NEW YORK, 200 tons, Downtown Athletic Club, to Kalman Steel Co.

BROOKLYN, 500 tons, sewer work, to McClintic-Marshall Co.

YONKERS, N. Y., 100 tons, railroad grade crossing elimination, to National Bridge Works.

BRONXVILLE, N. Y., 100 tons, addition to high school, to Concrete Steel Co.

WHITE PLAINS, N. Y., 230 tons, East View High School, to Truscon Steel Co.

AMENIA, N. Y., 135 tons, Wassaic State School, to Kalman Steel Co.

NEWARK, N. J., 200 tons, Lefcourt Building, to Truscon Steel Co.

RARITAN, N. J., 200 tons, State road work, to Igoe Brothers.

PHILADELPHIA, 1600 tons, Olney High School, to Concrete Steel Co.

SOMERVILLE, MASS., 1100 tons, First National Stores warehouse, to Jones & Laughlin Steel Corporation.

CINCINNATI, 100 tons, W. R. Hughes Building, to Joseph T. Ryerson & Son, Inc.

CHICAGO, 120 tons, building for the Chicago City Bank & Trust Co., to Concrete Engineering Co.

CHICAGO, 780 tons, building at 2000 Lincoln Park West, to an unnamed bidder.

CHICAGO, 300 tons, Atheneum building, to Kalman Steel Co.

CHICAGO, 120 tons, warehouse for Morton Salt Co., to Jones & Laughlin Steel Corporation.

CHICAGO, 500 tons, warehouse for Coca-Cola Co., to Calumet Steel Co.

CHICAGO, 120 tons, Klee Brothers Store, to Concrete Engineering Co.

SAN JOSE, CAL., 150 tons, packing plant for California Packing Corporation, to Concrete Engineering Co.

LOS ANGELES, 180 tons, apartment building, Second Street and Gramercy Place, to unnamed bidder.

OLYMPIA, WASH., 150 tons, highway work and viaduct, to Northwest Steel Rolling Mills.

YAKIMA, WASH., 250 tons, Ross Building, to Northwest Steel Rolling Mills.

SEATTLE, 2000 tons, Exchange Building, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PORTSMOUTH, OHIO, 800 tons, flood wall along Ohio River.

AURORA, ILL., 130 tons, theater.

CHICAGO, 800 tons, apartment building; McNally & Quinn, architects, A. Lindstrom, general contractor.

SEATTLE, 900 tons, addition to City-County building; bids rejected.

SEATTLE, 1225 tons, West Garfield Street bridge; bids postponed.

SEATTLE, 271 tons, West Spokane Street viaduct; Hans Pederson, low bidder.

TACOMA, WASH., 2550 tons, Cushman Dam Project No. 2; general contract to L. H. Hoffman, Portland, and Youdall Construction Co., San Francisco; bars not yet placed.

Hydraulic Compressed Scrap Stronger at Detroit

DETROIT, May 14.—The general tone of the market on old material in this district is stronger, with hydraulic compressed registering an advance of 25c. a ton. There has been considerable buying of this material, evidently for shipment by boat.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.00 to $14.50
Borings and short turnings	9.00 to 9.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	14.50 to 15.00
Automobile cast	16.00 to 16.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.50 to 10.00
No. 1 busheling	11.00 to 11.50
Sheet clippings	9.50 to 10.00
Flashings	12.00 to 12.50

Bear Steel & Wire Co. Buys Falcon Plant

The Bear Steel & Wire Co., 9 Clinton Street, Chicago, has bought the plant and equipment of the Falcon Tin Plate Co., Canton, Ohio, and will remodel it for the manufacture of sheets and tin plates. The company contemplates installing electric drives and equipment for continuous sheet rolling. The plant was recently bought by the Kulka Iron & Metal Co., Alliance, Ohio, which resold it to the Bear company. The new company will be incorporated as the Canton Rolling Mills Co.

Pacific Coast

Ford Plant in California Takes 3000 Tons of Shapes—Steel Prices Steady

SAN FRANCISCO, May 11.—(*By Air Mail*)—Important developments this week included the award of 3000 tons of shapes for the Ford automobile plant at Long Beach, Cal., to the McClintic-Marshall Co. and 725 tons of plates for a pipe line in Oakland to the Western Pipe & Steel Co. and the Steel Tank & Pipe Co. Demand for cast iron pipe, reinforcing steel bars and plates has increased. The price structure continues on a fairly even keel.

Pig Iron.—Movement of foundry pig iron is limited to small lots. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars. — Reinforcing steel bar awards this week, at more than 2800 tons, were the heaviest in over two months. The Pacific Coast Steel Co. took 2000 tons for the Exchange Building in Seattle, and the Northwest Steel Rolling Mills secured 250 tons for the Ross Building at Yakima, Wash. Bids on 1225 tons for the West Garfield Street bridge, Seattle, were postponed. Pending business totals over 7000 tons and includes 2550 tons for the Cushman dam project No. 2 at Tacoma, bids on which have been opened. In the San Francisco and Los Angeles districts, 2.30c., base, applies on carload lots and 2.60c., base, on smaller tonnages. Merchant bars are firm at 2.35c., c.i.f. Coast ports, but demand is limited to small lots.

Plates.—Los Angeles will open bids on May 14 for 575 tons of 24-in. electric welded pipe, alternate bids to be taken on lapwelded pipe. Everett, Wash., will shortly call for bids for 20 miles of 52-in. riveted or concrete pipe, involving 9000 tons. An award of 13,200 tons for two ships for the Matson Navigation Co., San Francisco, is expected within 10 days. Prices are unchanged at 2.35c., c.i.f.

Shapes. — Demand for structural shapes is increasing. Awards totaled more than 9000 tons, the largest for any week in more than two months. The McClintic-Marshall Co. took 2000 tons for an office building on Broadway, Los Angeles. Dyer Brothers secured 465 tons for the Roosevelt School, San Francisco. The Dominion Bridge Co. booked 2000 tons for an office building in Vancouver, B. C. Imports of structural shapes in February totaled 1599 tons, against 378 tons in the previous month. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Activity in the cast iron pipe market is increasing and awards totaled more than 1500 tons, the largest weekly aggregate in nearly two months. Hartenbower Brothers, Klamath Falls, took 678 tons of 20-in. Class B pipe for Klamath Falls, Ore. Southgate, Cal., placed 499 tons of 4 to 16-in. Class B pipe with V. Kovacevich. The United States Pipe & Foundry Co. secured 254 tons of 4 to 8-in. Class 150 pipe for Arroyo Grande, Cal. Daly City, Cal., awarded 104 tons of 4 to 8-in. Class C pipe to the California Construction Co. Pending business includes the following:

SOUTHGATE, CAL., 338 tons, 4 to 12-in. Class B improvement of Municipal District No. 1. Bids May 14.
GLOBE, ARIZ., 217 tons, 4 to 12-in. Class B. Bids opened.
OCEANSIDE, CAL., 341 tons, 6 to 12-in. Class B or centrifugal pipe. Bids May 22.
SILVER CITY, NEW MEX., 1123 tons, 6 and 8-in. Class B pipe. Bids May 31.
REDWOOD CITY, CAL., 193 tons, 4 to 8-in. Class B pipe. Bids May 20.
SEATTLE, WASH., 224 tons, 1-in. Class D pipe. Bids May 17.
OCEANSIDE, CAL., 360 tons, 14 and 16 in. Class B or welded steel pipe. Bids May 22.
GREAT FALLS, MONT., 226 tons, 6 and 8-in. Class B. Bids opened.
SOUTHGATE, CAL., 480 tons, 4 to 16-in. Class B pipe. Lee R. Weber, Santa Monica low bidder.

Importations of cast iron pipe in February totaled 3687 tons, compared with 1783 tons in January and 1843 tons in February, 1928. Of this total, 3578 tons came from French foundries.

Steel Pipe.—Demand for oil country goods has slackened owing to the oil conservation movement. Los Angeles will open bids on May 14 on 575 tons of 24-in. 5/16-in. wall, lapwelded or electrically welded steel pipe. Imports of tubular products in February were 2375 tons, compared with 944 tons in January and 1343 tons in February last year.

Track Material.—The United Commercial Co., San Francisco, was awarded 275 tons of 90-lb. rails and about 100 tons of track accessories by the Port Commission, Oakland. Long Beach, Cal., placed 344 tons of 75 to 128-lb. T and girder rails, and 12,660 tie plates and 103 kegs of track spikes with the Bethlehem Steel Co.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Steel Business Continues at the Heavy Rate of April—Pig Iron Market Dull

BIRMINGHAM, May 14.—Pig iron buying is still in small tonnages, and the market is without improvement. Shipping instructions are slow to develop, and the movement of iron is unsatisfactory. Seventeen furnaces are in blast.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.00 to $15.50
No. 1 fdy., 2.25 to 2.75 sil.	15.50 to 16.00
Basic	15.00 to 15.50

Finished Steel.—New business in bars, plates and shapes continues at the brisk rate that put April ahead of any month in several years. Bookings in April were more than double those of the same month last year. Mills are operating at about 85 per cent of capacity, and indications are that this rate will be maintained through May at least. Demand for wire products, light weight steel shapes and railroad accessories is improving. Steel from this district is moving farther into the Middle West than is usually the case. Prices are steady. Demand for fabricated structural steel is heavy; some shops are operating on double time. The Virginia Bridge & Iron Co. has booked 2200 tons for the tire fabric mill of the Goodyear Tire & Rubber Co. at Rockmart, Ga. Open-hearth operations are undiminished.

Cast Iron Pipe.—Demand is the lightest in some time. The projects up for figures are of little importance. The National Cast Iron Pipe Co. has been awarded a project at Nashville requiring 640 tons. The American Cast Iron Pipe Co. has booked 460 tons for Klamath, Ore.; 280 tons for Minneapolis; 377 tons for Hebron, N. D.; 230 tons for Wayzata, Minn., and 180 tons for Beech, Mich. Small-order business is below normal. The base prices remain at $37 to $38 for 6-in. and larger sizes.

Coke. — Production by merchant ovens is nearly at capacity. Prices remain at $5 for both spot and contract.

Old Material. — Improved buying during the past two weeks has not moved the market out of its sluggish state. Plenty of old material is obtainable. Quotations are unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	13.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	13.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	$10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	14.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Boston

Buffalo Iron Available at $18 to $18.50, Furnace—Scrap Weaker and Shipments Are Declining

BOSTON, May 14.—Buying of pig iron the past week was light. One of the largest sales was 500 tons of No. 1X Champlain iron to the Westinghouse Electric & Mfg. Co., Springfield, Mass., for third quarter delivery at the equivalent of $18.50 a ton, base furnace. Buffalo iron is obtainable at $18 to $18.50 a ton, base furnace. A sale of eastern Pennsylvania No. 2X iron to a Connecticut foundry is reported at $19.25 a ton, furnace, which is quite out of line with recent openly quoted prices.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.91 to $23.41
*Buffalo, sil. 2.25 to 2.75	23.41 to 23.91
East. Penn., sil. 1.75 to 2.25	25.15
East. Penn., sil. 2.25 to 2.75	25.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
Ala., sil. 1.75 to 2.25	21.91 to 24.27
Ala., sil. 2.25 to 2.75	22.41 to 24.77

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.

*All rail rate.

Reinforcing Bars.—The 1100 tons of billet steel reinforcing bars required for the First National Stores warehouse, Somerville, Mass., went to the Jones & Laughlin Steel Corporation. Otherwise business was confined to small lots. Rail steel bars are 2.26½c. per lb., base, delivered common Boston freight rate points, and billet steel reinforcing bars 2.66½c. per lb., base, from stock.

Cast Iron Pipe.—Revere, Mass., has closed bids on 200 tons of 6 to 12-in. pipe, and Swampscott on 150 tons of 6-in. Class B, but no awards have been made. East Bridgewater, Mass., took bids May 14 on 144 tons of 6-in. Wayland, Mass., will award 1000 tons of 6 and 8-in. stock, probably this week. West Springfield, Mass., has closed with the Warren Foundry & Pipe Co. for 100 tons of 16 and 18-in. pipe and fittings. Early next month East Providence, R. I., will be in the market for a substantial tonnage. Quotations made openly on domestic pipe are: 4 in., $47.60 a ton, delivered common Boston freight rate points; 6 to 12 in., $43.10 to $44.10; 16 to 20 in., $42.10 to $43.10. A $3 differential is asked on Class A and gas pipe.

Old Material.—A further easing in the market for No. 1 heavy melting steel, steel turnings and mixed borings and turnings, amounting to 25c. a ton, is noted. Most of the business in steel turnings taken the past week was at $6.60 a ton, on cars shipping point. The movement of old material to Pennsylvania consuming points grows less each week.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $11.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 6.75
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	9.00 to 10.00
Forged flashings	10.00 to 10.50
Blast furnace boring and turnings	5.75 to 6.00
Forged scrap	9.00 to 9.50
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.50 to 11.00
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$14.50 to $15.00
No. 1 machinery cast	16.50 to 17.00
No. 2 machinery cast	14.50 to 15.00
Stove plate	11.50 to 12.00
Railroad malleable	19.00 to 19.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Spares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Buffalo

Steel Mills Still Operating at Capacity—Pig Iron Quiet, but Prices Are Steady

BUFFALO, May 14.—Buying of pig iron is still lagging. Furnaces with large order books are making no attempt to outbid each other for the going tonnage. The General Electric Co. placed 1300 tons of malleable for its Elmira plant. It is said that the iron went to the Port Henry maker. Two sales of 300 tons of foundry are reported for district delivery, one of No. 2 plain at $19.50 and the other of 2X at $20. A sale of 400 tons is reported in the district at $19.50, base, and another of 250 tons at the same base. Most users are covered for the second quarter, and so far little interest is shown in third quarter delivery. Prices are apparently holding firmly at $19.50 in the district and at $18 to $18.50 in the East, depending on the extent of the competition. Buffalo producers are now loading canal barges for Eastern shipment, and this tonnage is expected to move this week, water conditions in the canal permitting.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50 to $19.50
No. 2X fdy., sil. 2.25 to 2.75	19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25	20.00 to 21.00
Malleable, sil. up to 3.25	19.00 to 20.00
Basic	17.50 to 18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Buffalo mills are still being operated at capacity. Deliveries are not improved. Sheet business is particularly good, deliveries ranging from six to seven weeks on some finishes, while on others makers are sold up for the remainder of the quarter.

Old Material.—The market for No. 1 heavy melting steel is still quiet. Dealers have paid as high as $20 for knuckles and couplers, coil and leaf springs and rolled steel wheels, and this price also was received by railroads for malleable scrap. The Michigan Central No. 1 heavy melting steel brought $17.15, Black Rock, a 35c. switching charge bringing this up to $17.50, delivered Buffalo plants. A few small sales of No. 1 machinery cast scrap are reported at $16.50 to $16.75. Machine shop turnings are weak.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.25 to $17.50
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	17.00 to 18.00
Hydraul. comp. sheets	14.75 to 15.00
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.00 to 14.50
No. 1 busheling	16.50 to 16.75
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.50 to 14.00
Acid Open-Hearth	
Knuckles and couplers	19.50 to 20.00
Coil and leaf springs	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short. shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.50 to 14.00
Locomotive grate bars	13.50 to 14.00
Steel rails, 3 ft. and under	20.50 to 21.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	19.75 to 20.00
Railroad	19.75 to 20.00
Agricultural	19.50 to 20.00
Special Grades	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

Cincinnati

Pig Iron Quiet—Southern Grades Still Weak—Sheet Production at Capacity—Specifications Decline

CINCINNATI, May 14.—There has been a small amount of third quarter pig iron buying in the past week, and an inquiry for about 5000 tons of foundry iron for that delivery is pending, but most of the dealers report that the market still is quiet. Southern iron is weak and is available in the Ohio River district at $15, Birmingham, although one or two furnaces are declining to sell under $15.50. Since furnaces in the South are said to have a large surplus of stock in their yards, no improvement in the price situation is foreseen in the immediate future. Northern foundry iron is firm at $18.50, furnace. The Marting Iron & Steel Co., Ironton, Ohio, has a small tonnage of iron remaining and is disposing of it at concessions. The new silvery iron furnace of the Globe Iron Co., Jackson, Ohio, will be blown in about June 1.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Shipments of by-product foundry coke are slightly under the April volume, but are of good proportions. The price is unchanged at $10.05, delivered Cincinnati.

Finished Material.—There has been a slackening in specifications and orders for sheet steel, although the leading independent maker reports last week's bookings at close to 100 per cent of capacity. Production at all units continues at full capacity. Interest is centering in third quarter prices, which will be announced in a few days. An advance of $2 a ton on some grades and possibly on all grades is expected. Demand for structural steel is light and district fabricators are badly in need of work.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Old Material.—Dullness pervades the scrap market. Forward buying has been negligible, and steel plants in some cases are asking dealers to slow up shipments on current contracts. Borings, turnings, burnt cast, stove plate and brake shoes are down 25c. Malleable grades also are bringing slightly less than they were a week ago, although demand has been well sustained.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.50 to 10.00
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

workers and building laborers, which has caused a halt also in new projects. The only award of the week was 150 tons of structural steel to the Mississippi Valley Structural Steel Co. for the Terminal Railway Association. The Granite City Steel Co. reports an improvement in the demand for galvanized sheets.

Old Material.—The market for old material generally is soft, but price changes are few. Receipts in this market have been rather heavy. Dealers who formerly shipped to Colorado and Oklahoma points are now looking to St. Louis for a market. Steel car axles and stove plate are 25c. lower, and cast iron car wheels are off 50c. Railroad lists are heavy, and include: Louisville & Nashville, 10,000 tons; Chesapeake & Ohio, 7212 tons; Wabash, 2890 tons; Pere Marquette, 1950 tons; Missouri-Kansas-Texas, 1540 tons; Terminal Railway Association (St. Louis), 2538 tons; International-Great Northern, 660 tons; Ann Arbor, 135 tons of rail; Kansas City Southern, 448 tons; Rock Island, 190 carloads; Great Northern, 62 carloads; Cotton Belt, 34 carloads; Chicago & Alton, 30 carloads; Nickel Plate, 30 carloads; Chicago & Eastern Illinois, 15 carloads; Belt Railway (Chicago), 14 carloads; Nashville, Chattanooga & Tennessee and Chicago, Milwaukee & St. Paul, 11 carloads each.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	17.00 to 17.50
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.00 to 8.50
Heavy turnings	10.00 to 10.50
Steel car axles	18.75 to 19.25
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.50 to 14.00
Steel rails, less than 3 ft.	16.50 to 17.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed, nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

St. Louis

Improved Demand for Galvanized Sheets—Pig Iron Market Quiet—Scrap More Plentiful and Weak

ST. LOUIS, May 14.—Buying of pig iron was light during the last week. The St. Louis Gas & Coke Corporation sold only about 1500 tons, of which 500 tons to a stove plant was for third quarter. Of the remainder, 300 tons was sold to a local stove foundry, 200 tons to a Quincy melter, and 150 tons to a Louisville concern for second quarter. While the melt is sustained, buyers are well covered on their requirements for second quarter and are awaiting developments before committing themselves further. The market continues firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$19.42 to 19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—More than $3,500,000 in building work is tied up by the strike of iron and concrete

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Structural Steel Projects Feature Steel Market

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Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.10 to $24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10 to 24.60
Malleable	24.10 to 24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.50 to $26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	25.50 to 26.00
Basic	24.50 to 25.00
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Sales for the week were chiefly in small lots. Among the larger pending orders are: 2000 tons for bridge over the Saguenay River at Ste. Anne, Que., for the Ste. Anne Bridge Co.; 2000 tons for the high level bridge over False Creek for the city of Vancouver, B. C.; 1500 tons for bridge at St. Thomas, Ont., for the Michigan Central.

Old Material.—Following the price advances on several grades in Toronto a week ago, a number of lagging holders came into the market with material, and the available supply is now somewhat better, although in some lines a decided shortage exists.

Dealers' buying prices:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
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More Than 39,000,000 Hp. in Manufacturing Units

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To aid in the detection and identification of internal fissures when they reach the surface of the rail head the Robert W. Hunt Co., engineers, Chicago, has issued a fissure card. The card is being tacked up in tool houses or other convenient locations along railroads, where it can be studied by trackmen. The Hunt company is distributing it to clients without charge and to others at cost. Although the card has only been available since March 1, more than 15,000 of them are already in use.

Railroad Equipment

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Austin Co., Cleveland, has been awarded contracts for the design and construction of a 112 x 150 ft. one-story monitor type building for the Carlton Machine Tool Co., Cincinnati, the estimated cost of which is $40,000; a new plant for the Meurer Steel Barrel Co., Inc., Long Island City, N. Y., which will be 175 x 300 ft.; for a one-story building, 70 x 125 ft., for the Highland Body Mfg. Co., Elmwood, Cincinnati. Austin Co. has also taken a contract for a dry ice plant to be built in Denver, Colo., for the Liquid Carbonic Co., 3100 South Kedzie Avenue, Chicago.

Cincinnati

Pig Iron Quiet—Southern Grades Still Weak—Sheet Production at Capacity—Specifications Decline

CINCINNATI, May 14.—There has been a small amount of third quarter pig iron buying in the past week, and an inquiry for about 5000 tons of foundry iron for that delivery is pending, but most of the dealers report that the market still is quiet. Southern iron is weak and is available in the Ohio River district at $15, Birmingham, although one or two furnaces are declining to sell under $15.50. Since furnaces in the South are said to have a large surplus of stock in their yards, no improvement in the price situation is foreseen in the immediate future. Northern foundry iron is firm at $18.50, furnace. The Marting Iron & Steel Co., Ironton, Ohio, has a small tonnage of iron remaining and is disposing of it at concessions. The new silvery iron furnace of the Globe Iron Co., Jackson, Ohio, will be blown in about June 1.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Shipments of by-product foundry coke are slightly under the April volume, but are of good proportions. The price is unchanged at $10.05, delivered Cincinnati.

Finished Material.—There has been a slackening in specifications and orders for sheet steel, although the leading independent maker reports last week's bookings at close to 100 per cent of capacity. Production at all units continues at full capacity. Interest is centering in third quarter prices, which will be announced in a few days. An advance of $2 a ton on some grades and possibly on all grades is expected. Demand for structural steel is light and district fabricators are badly in need of work.

Old Material.—Dullness pervades the scrap market. Forward buying has been negligible, and steel plants in some cases are asking dealers to slow up shipments on current contracts. Borings, turnings, burnt cast, stove plate and brake shoes are down 25c. Malleable grades also are bringing slightly less than they were a week ago, although demand has been well sustained.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.50 to 10.00
Bundled sheets	10.50 to 11.00
Cast iron borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	6.75 to 7.00
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.00 to 13.50
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	14.25 to 14.75

Old Material.—The market for old material generally is soft, but price changes are few. Receipts in this market have been rather heavy. Dealers who formerly shipped to Colorado and Oklahoma points are now looking to St. Louis for a market. Steel car axles and stove plate are 25c. lower, and cast iron car wheels are off 50c. Railroad lists are heavy, and include: Louisville & Nashville, 10,000 tons; Chesapeake & Ohio, 7212 tons; Wabash, 2890 tons; Pere Marquette, 1950 tons; Missouri-Kansas-Texas, 1540 tons; Terminal Railway Association (St. Louis), 2538 tons; International-Great Northern, 660 tons; Ann Arbor, 135 tons of rail; Kansas City Southern, 448 tons; Rock Island, 190 carloads; Great Northern, 62 carloads; Cotton Belt, 34 carloads; Chicago & Alton, 30 carloads; Nickel Plate, 30 carloads; Chicago & Eastern Illinois, 15 carloads; Belt Railway (Chicago), 14 carloads; Nashville, Chattanooga & Tennessee and Chicago, Milwaukee & St. Paul, 11 carloads each.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.50 to $14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	17.00 to 17.50
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	15.50 to 16.00
Machine shop turnings	8.00 to 8.50
Heavy turnings	10.00 to 10.50
Steel car axles	18.75 to 19.25
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	13.50 to 14.00
Steel rails, less than 3 ft.	16.50 to 17.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.50 to 16.00
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Agricult. malleable	15.00 to 15.50
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Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$19.42 to 19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—More than $3,500,000 in building work is tied up by the strike of iron and concrete workers and building laborers, which has caused a halt also in new projects. The only award of the week was 150 tons of structural steel to the Mississippi Valley Structural Steel Co. for the Terminal Railway Association. The Granite City Steel Co. reports an improvement in the demand for galvanized sheets.

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Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
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Galv. sheets (No. 24)	5.10c.
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No. 2 fdy., sil. 1.75 to 2.25	24.10 to 24.60
Malleable	24.10 to 24.60

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No. 2 fdy., sil. 1.75 to 2.25	25.50 to 26.00
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Summerlee	$33.50
Carron	33.00

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Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
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Axles, wrought iron	17.00	22.00
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Vanadium Applied to Industry

Its Many Uses Reviewed—Over Half of Ferrovanadium Now Made Electrically—Its Use as a Catalyzer

VANADIUM is a potent factor in structural steel in controlling grain size and has a great future as a process element in such control, the Washington-Baltimore chapter of the American Society for Steel Treating was told at Washington at its final meeting of the year on Tuesday, May 7, by Jerome Strauss, chief research engineer of the Vanadium Corporation of America, who spoke on "Vanadium in Industry."

In the course of a general survey on the production and uses of vanadium, Mr. Strauss, with the use of illustrations, explained that the chief metallurgical application of vanadium was in such industries as automotive, industrial machinery, oil refining, oil well drilling, steam generation and railroads. A new application was seen in its use as a catalyzer. The oil refining industry, it was stated, uses vanadium steel to construct large reaction chambers. A use that will become more general was said to be in plates and rivets in connection with increasing boiler pressures and temperatures and for auxiliary parts in such services, including valves.

Plain Vanadium Steel for Forgings

Mention also was made of carbon-vanadium steel for automobile crankshafts, especially for straight-eight engines, which require a large number of bearings. Much was said to have been done by vanadium in reducing straightening operations and in completely avoiding distortion. By its use in spring steel, vanadium was said to have brought about a great improvement in the riding comfort of railroad cars and in reducing spring failures.

Thus far, Mr. Strauss declared, the greatest uses of vanadium in steel are as carbon and chrome-vanadium in structural steel. At some length he recited uses of steel with nickel and vanadium and small amounts of molybdenum and vanadium, as well as cast steels with vanadium, and their compositions. In high-speed steels it was stated that there has been a constant creeping up in the amounts of vanadium used, which has run from 0.75 per cent to as high as 2.5 per cent in vanadium in some instances. One of the functions of vanadium, besides its making for fine grain, was said to be the stabilizing of the carbide in high-speed steel.

Mr. Strauss said that one of the most important applications of vanadium is in the main frames, driving wheel centers, cross-heads and other parts of locomotives. A very small amount of vanadium in steel castings, it was stated, results in a marked increase in tensile strength and ductility. Such castings contain a minimum of 0.15 per cent vanadium and are otherwise of standard compositions, with a carbon range of 0.23 to 0.35 per cent. Steel castings should not, it was said, be used as cast. Some treatment, such as annealing or normalizing plus annealing, Mr. Strauss said, is necessary to obtain the highest properties, with vanadium present. Little has been done, Mr. Strauss stated, with vanadium in the non-ferrous field.

Vanadium Produced in Electric Furnaces

Illustrations of methods of production, including the electric furnace and the alumino-thermic processes, were presented and explained. The electric furnace was said to produce 55 per cent and the thermite process 45 per cent of the world output of vanadium. The latter was said to be used generally for tool steels and in some countries, according to Mr. Strauss, is probably used for economic reasons because it is less costly than is production by small electric furnaces.

Much talk has been indulged in, Mr. Strauss said, about the scavenging nature of vanadium, but he expressed the view that this is the last purpose for which it should be used. The product was declared to be too expensive for such use.

The trend of discussion by Dr. H. W. Gillett, chief, division of metallurgy, Bureau of Standards, emphasized the importance of the effect of vanadium in producing fine grain in steel. It was also brought out that the mechanism by which this effect is obtained is still obscure. H. J. French, International Nickel Co., New York, made the point that the high temperature properties of low alloy heat-resisting steel, such as vanadium steels, are not permanent because of scaling. It was developed by Dr. S. L. Scott of the General Electric Co., however, that for many purposes in large construction, as in turbines, non-scaling steels, such as high-nickel-chromium steels, are too expensive and that vanadium steel therefore would serve useful purposes.

The address was preceded by a dinner at the Cosmos Club and was largely attended, about 80 being present. Among those present were the national officers of the society and G. K. Burgess, director of the Bureau of Standards.

New Classifications for Blue Annealed Sheets

New classifications of flat-rolled steel that now come under the blue annealed sheet classification have been prepared to remedy some of the present price inconsistencies, which in a measure are due to the changes in manufacturing methods and in production costs brought about by the introduction of continuous mills. The changes are expected to result advantageously for jobbing mills that have suffered severely from the continuous mill competition. These classifications are expected to be generally adopted soon.

Under the proposed plan, the products now sold on the blue annealed sheet base will be divided into two distinct divisions, one including the heavier material to be known as light plates and the other material in the lighter gages to be classed as blue annealed sheets. Blue annnealed sheets will evidently lose their identity as such in gages heavier than 13.

The light plates are to carry a 2.20c. base for Nos. 9 and 10 and the blue annealed price will be based on No. 13 gage, carrying a 2.35c. base for that gage. The differentials proposed for light plates are: Nos. 7 and 8 gage, base minus 5c.; No. 11 gage, base plus 5c.; No. 12 gage, base plus 10c. The proposed blue annealed differentials are: No. 14 gage, base plus 5c.; No. 15 gage, base plus 10c.; No. 16 gage, base plus 15c.; No. 12 gage, base minus 5c.; No. 11 gage, base minus 10c.; Nos. 9 and 10 gage, base minus 15c. These differentials differ somewhat from those now current.

Gain in Steel Corporation's Orders in April

Another increase in the unfilled orders on the books of the United States Steel Corporation was registered in April. The gain was 17,045 tons and was the fifth successive monthly increase. On April 30 the total unfilled business was 4,427,763 tons, compared with 4,410,718 tons on March 31. A year ago total unfilled orders were 3,872,123 tons.

The current figure is the largest in any month since February, 1926, when 4,716,822 tons was reported. The April increase compares with 266,377 tons in March, 34,854 tons in February; 132,775 tons in January and 303,712 tons in December. In November there was a decrease of 78,030 tons. The table gives the data for the last 16 months.

	1929	1928
Jan. 31	4,109,487	4,275,947
Feb. 28	4,144,341	4,398,189
Mar. 31	4,410,718	4,335,206
Apr. 30	4,427,763	3,872,133
May 31	.....	3,416,822
June 30	.....	3,637,009
July 31	.....	3,570,927
Aug. 31	.....	3,624,043
Sept. 30	.....	3,698,368
Oct. 31	.....	3,751,030
Nov. 30	.....	3,673,000
Dec. 31	.....	3,976,712

New York office of the American Crusher & Machinery Corp. has been moved from 1440 Broadway to 853 Broadway.

Non-Ferrous Metal Markets

Copper Firm But Dull, Tin Steady and Moderately Active, Lead Quiet and Unchanged, Zinc Stronger and More Active

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY.

	May 14	May 13	May 11	May 10	May 9	May 8
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	44.25	44.25	....	44.62½	44.50	44.37½
Zinc, East St. Louis	6.67½	6.65	6.60	6.60	6.60	6.60
Zinc, New York	7.02½	7.00	6.95	6.95	6.95	6.95
Lead, St. Louis	6.75	6.75	6.80	6.80	6.80	6.80
Lead, New York	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

NEW YORK, May 14.

Copper.—Statistics for April furnish the principal news, demand for the metal being exceedingly light. The feature last month was the daily rate of production at 5376 tons, a new record for all time for refined copper. Refined stocks increased 4526 tons and blister copper stocks were about 12,000 tons larger than in the previous month. Thus, the total metal above ground on May 1, at 311,966 tons, was 16,687 tons larger than on April 1. An interesting fact is that mine production in the United States was only about 300 tons larger than in March. Refined stocks at the end of April were 57,494 tons, which is not regarded as large, 100,000 tons being nearer normal. Shipments during April decreased about 9000 tons. Demand, both domestic and foreign, continues very light and is being entirely taken care of by custom smelters. Their sales are about equal to their intake. Demand is spread over May, June and July, and practically no metal has been sold for August by any electrolytic producer. August business will probably begin to be booked by June 1, or perhaps sooner. Prices are firm and unchanged at 18c., delivered in the Connecticut Valley, and at 18.30c., c.i.f. usual European ports. A moderate business is reported in Lake copper at 18c. to 18.12½c., delivered, with a little August delivery booked.

Tin.—Talk of a cartel to control production and prices in London has been the chief topic of interest. The plan is to control the Straits, Bolivian and Dutch markets. It is reported that no one on this side has any faith in the project. Speculators began to buy when the report appeared, but importers sold as fast as speculators bought. London did not place much faith in the rumor, according to reports from there. About 800 tons of Straits tin was sold in the week ended May 11. Dealers were more active again and there were more fluctuations in prices, which may indicate active trading soon. Sales were made mostly by regular importers. Consumers are still buying only on the scale down. London prices today were a little higher than a week ago, with spot standard quoted at £198 5s., fu-

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—

High brass	23.25c.
Copper, hot rolled	26.75c.
Zinc	10.25c.
Lead (full sheets)	11.00c. to 11.25c.

Seamless Tubes—

High brass	28.25c.
Copper	29.25c.

Rods—

High brass	21.25c.
Naval brass	24.00c.

Wire—

Copper	19.87½c.
High brass	23.75c.
Copper in Rolls	26.75c.
Brazed Brass Tubing	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	46.00c. to 47.00c.
Tin, bar	48.00c. to 49.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.75c. to 8.25c.
Lead, bar	9.75c. to 10.25c.
Antimony, Asiatic	11.00c. to 11.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commercial grade,	30.00c. to 40.00c.
Solder, ½ and ½	29.50c. to 30.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	48.63c.
Tin, bar	50.63c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.75c. to 8.00c.
Lead, bar	10.00c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	51.75c.
Solder, ½ and ½	31.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.00c.	16.00c.
Copper, hvy. and wire	13.75c.	15.25c.
Copper, light and bottoms	12.00c.	13.50c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.00c.	8.50c.
Hvy. machine composition	11.25c.	12.50c.
No. 1 yel. brass turnings	9.50c.	11.00c.
No. 1 red brass or compos. turnings	11.00c.	12.00c.
Lead, heavy	5.50c.	6.25c.
Lead, tea	4.75c.	6.00c.
Zinc	4.25c.	5.00c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.50c.	14.50c.

ture standard at £201 and spot Straits at £199 15s. The Singapore quotation today was £203 10s. The market here is inactive this week, and spot Straits today is quoted at 44.25c., New York.

Lead.—Because consumers have considerable metal yet to buy for June and some for May, the present rather inactive market is expected to improve soon. Prices are a little easier at 6.75c., St. Louis, with the leading producer there largely out of the market, though quoting 6.80c. The quotation of the leading interest is unchanged at 7c., New York, as its contract price.

Zinc.—Better demand, reflected in fairly good sales the last day or two, has stiffened the market. Prime Western zinc sold today as high as 6.70c., East St. Louis, with some metal still available at 6.65c. One or two producers are now quoting 6.70c. as the minimum and even 6.80c. is noted. The ore price for the week ended May 11 was still $44, Joplin. Stocks showed a further increase of about 4000 tons, with production for the week at 13,200 tons and sales about 7900 tons.

Antimony.—In a dull market, Chinese metal is easier at 9c. per lb., New York, duty paid, for all positions.

Nickel.—Wholesale lots of ingot nickel are unchanged at 35c., with shot nickel at 36c. and cathodes of electrolytic nickel at 35c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is unchanged at 23.90c. per lb., delivered, the published price.

Non-Ferrous Metals at Chicago

CHICAGO, May 14.—This market is quiet from the viewpoint of sales. Price changes this week are advances in tin and zinc. The old metal market is dull but quotations are holding.

Prices per lb., in carload lots:

Lake copper, 18.12½c.; tin, 45c.; lead, 6.85c.; zinc, 6.75c.; in less-than-carload lots: antimony, 10.25c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards Totaling 27,000 Tons Same As in Previous Week —New Projects Show Increase With 24,000 Tons

TOTAL awards of 27,000 tons of fabricated steel business, about the same as in the previous week, included 3000 tons for a Ford Motor Co. plant at Long Beach, Cal. Pending business totaling 24,000 tons includes 5000 tons for a hotel in Vancouver, B. C., and 5000 tons for a building in Chicago. The West Side traffic highway in New York, requiring 22,500 tons of steel for the first section, may be postponed if plans for Hudson River dock extensions materialize. Awards follow:

BOSTON, 600 tons, medical building for City Hospital, to New England Structural Co.

NEW YORK, 400 tons, garage on East Seventy-seventh Street, to A. E. Norton Co.

NEW YORK, 1100 tons, building for New York Central Railroad on West End Avenue, Sixty-fifth and Sixty-sixth Streets, to McClintic-Marshall Co.

NEW YORK, 1300 tons, warehouse at 80 Pearl Street, to Heddon Iron Construction Co.

HAZLETON, PA., 135 tons, building for Oliver Filter Co., to unnamed fabricator.

SPRING MILLS, PA., 450 tons, factory for Walker Co., to Shoemaker Bridge Co.

HANCOCK, MD., 250 tons, building for Pennsylvania Glass Sand Co., to Belmont Iron Works.

COLUMBIA, PA., 150 tons, sheet steel piling for Columbia-Wrightsville, Pa., bridge, to Jones & Laughlin Steel Corporation.

WASHINGTON, 2500 tons, department store, to Lehigh Structural Steel Co.

DUKE, N. C., 300 tons for Duke University, to Southern Engineering Co.

CHESAPEAKE & OHIO RAILROAD, 250 tons, bridge in West Virginia, to American Bridge Co.

ROCKMART, GA., 2200 tons, tire fabric mill for Goodyear Tire & Rubber Co., to Virginia Bridge & Iron Co.

SAN ANTONIO, TEX., 1900 tons, garage and office building for J. M. Nix, to Orange Car & Steel Co., Orange, Tex.

PITTSBURGH, 300 tons, Aiken Avenue bridge for city of Pittsburgh, to Independent Bridge Co.

CLEVELAND, 190 tons, bridge at East 109th Street for Nickel Plate Railroad, to American Bridge Co.

INDIANAPOLIS, 500 tons, for Marmon Motor Co. plant, to Massillon Bridge & Structural Co.; H. K. Ferguson Co., Cleveland, general contractor.

EVANSVILLE, IND., 700 tons, telephone company building, to Whitehead & Kales Co.

CHICAGO, 100 tons, building for Western Electric Co., to Midland Structural Steel Co.

WAUKEGAN, ILL., 400 tons, building for Johns-Manville, Inc., to American Bridge Co.

MILWAUKEE, 2500 tons, building for Milwaukee Gas & Light Co., to Worden-Allen Co.

ST. LOUIS, 150 tons, addition to subway for Terminal Railway Association, to Mississippi Valley Structural Steel Co.

WABASH RAILROAD, 1500 tons, bridges, to American Bridge Co.

MCGILL, NEV., 500 tons, building for Consolidated Copper Co., to Kansas City Structural Steel Co.

SAN FRANCISCO, 260 tons, office building addition, 340 Sansome Street, to Judson-Pacific Co.

SAN FRANCISCO, 465 tons, Roosevelt School, to Dyer Brothers.

OAKLAND, 275 tons, hangar No. 5 for Port Commission, to Herrick Iron Works.

OAKLAND, 725 tons, 30 to 48-in. welded steel pipe for East Bay Municipal Utility District; 575 tons to Western Pipe & Steel Co., and 150 tons to Steel Tank & Pipe Co.

ORANGE, CAL., 125 tons, 250,000-gal. steel tank and tower, to Chicago Bridge & Iron Works.

LONG BEACH, CAL., 3000 tons, Ford plant, to McClintic-Marshall Co.

LOS ANGELES, 2000 tons, office building, Ninth Street and Broadway, to McClintic-Marshall Co.

VANCOUVER, B. C., 2000 tons, office building for G. A. Stimson & Co., to Dominion Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 500 tons, hospital addition.

GARDNER, MASS., 100 tons, hospital.

STATE OF MASSACHUSETTS, 300 tons, highway bridges.

LONG ISLAND CITY, N. Y., 500 tons, addition to plant of National Casket Co.

NEW YORK, 3000 tons, improvements to Queensborough Bridge.

ALBANY, N. Y., 2500 tons, for National Savings Bank.

ROCK HILL, S. C., 700 tons, for Rock Hill Printing Co.

CHICAGO, 135 tons, building for Chicago Screw Co.; J. B. Fisher, architect.

CHICAGO, 300 tons, Fisk Street substation for Commonwealth Edison Co.

CHICAGO, 5000 tons, Patterson Estate building, revived.

BARRINGTON, ILL., 2000 tons, office building for Jewel Co.

BURNHAM, ILL., 1200 tons, viaduct over Grand Calumet River.

STATE OF SOUTH DAKOTA, 500 tons, highway bridges.

NIAGARA, WIS., 300 tons, deck plate girder span to Iron Mountain, Mich.; Chernus Construction Co., Minneapolis, low bidder.

STATE OF COLORADO, 500 tons, highway bridges.

DENVER, 1200 tons, plates, 96-in. siphon for Belle Fourche project, South Dakota; Western Pipe & Steel Co., low bidder.

VANCOUVER, B. C., 5000 tons, hotel; bids opened.

Gain in German Machinery Trade in 1928

WASHINGTON, May 14.—In spite of rather gloomy monthly reports from the German Machinery Manufacturers' Association and other sources, official German statistics and the annual report of the association indicate that in both exports and internal business the German machinery industry did well in 1928, according to a report to the Department of Commerce from Berlin. As compared with 1913 the value of production was 4 per cent higher during 1928. As against 100 per cent in 1913, only 72 per cent of capacity was utilized during 1928. Export sales including reparations in kind, increased in 1928 by 22 per cent over 1927, and were 11 per cent greater than in 1913.

PERSONAL

MARCUS T. LOTHROP has been elected president of the Timken Roller Bearing Co., Canton, Ohio, succeeding H. H. TIMKEN, who has become chairman of the board. Mr. Lothrop became connected with the company in 1911 as a metallurgist and has since served in various capacities. For some time he was in charge of operations and for the last few years has been

M. T. LOTHROP

vice-president and general manager in charge of all operations and sales. J. W. SPRAY, vice-president and general sales manager, and A. C. ERNST of Cleveland are newly elected directors.

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J. J. MELLON has become sales engineer for Clark Controller Co., Cleveland.

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R. S. ARTHUR, formerly in charge of the Chicago office of Dravo Equipment Co., has been appointed manager of the Midwestern branch office at 176 North Wacker Drive, Chicago, by Aeroil Burner Co., West New York, N. J.

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LOUIS E. MURPHY has been elected president of E. F. Houghton & Co., Philadelphia, to succeed the late Charles E. Carpenter. A. E. CARPENTER was elected first vice-president and treasurer, and GEORGE W. PRESSELL was elected second vice-president and secretary.

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VICTOR HOMERBERG, Massachusetts Institute of Technology, Cambridge, was scheduled to speak on "Nitralloy and the Nitriding Process" at the May meeting of the Hartford Chapter of the American Society for Steel Treating, May 14, at Hartford Electric Light Co. Assembly Hall.

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WARREN D. OAKES has been elected president of Oakes-Swenson Co., Indianapolis. Other officers elected were: JAMES L. GAVIN and ERIC SWENSON, vice-presidents; CARL G. SWENSON, secretary, and PARRY OAKES, treasurer.

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L. A. ROWLAND, for the past 10 years superintendent of the plow works, John Deere & Co., Moline, Ill., has been made works manager of John Deere Tractor Co., Waterloo, Iowa. His assistant, FRANK M. HUMASON, succeeds him as superintendent at the plow works, and L. A. MURPHY becomes assistant superintendent.

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J. B. JOHNSTON, chief materiel branch, War Department Air Corps, Wright Field, Dayton, Ohio, was scheduled to discuss welding and aircraft metallurgy at a meeting of the Indianapolis chapter of the American Society for Steel Treating on May 13. This chapter is planning a special testing instruments meeting on May 21 to be held at the Ewart Works of the Link-Belt Co. At this session the use of instruments in the company's testing laboratories will be demonstrated.

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J. H. VAN CAMPEN has been appointed chief engineer of the Warren works, Warren, Ohio, of the Republic Iron & Steel Co. He has been identified with the steel industry for the past 20 years, having been connected with the Bethlehem Steel Co., Weirton Steel Co., Midvale Steel & Ordnance Co., Timken Roller Bearing Co., and later as chief engineer with the E. W. Bliss Co.

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WILLIAM K. STAMETS, Jenkins Arcade Building, Pittsburgh, machinery dealer, sailed on May 10 for a two months' business trip in Europe.

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R. L. CATHCART, for eight years district sales manager at Pittsburgh for the New Jersey Zinc Sales Co., New York, and who for the last three years has been vice-president of the E. E. Zimmerman Co., Pittsburgh, has established his own office at 2247 Oliver Building, Pittsburgh, and will act as exclusive agent on tin for Metal Traders, Inc., New York, in that district. He will also conduct a brokerage business in slab zinc, lead, antimony, cadmium and other metals.

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E. C. HUMMELL has been appointed general manager of the foundry department of the Otis Steel Co., Cleveland, succeeding J. J. BEVER, who after an extended vacation will serve the foundry in an advisory capacity. Mr. Bever will complete 30 years of continuous service with the company in August.

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A. A. OSSWALD, formerly connected with the Cleveland Punch & Shear Co., has become direct factory representative in the Ohio territory, with offices at 710 Hippodrome Building, Cleveland, for the V & O Press Co., Hudson, N. Y.

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SAM TOUR, consulting metallurgist, New York, spoke at the May meeting of the Worcester Chapter of the American Society for Steel Treating, May 9, at Rebboli's Restaurant. His subject was "Heat Treatment with Salt Baths."

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C. B. PHILLIPS, who has been assistant sales manager of the Surface Combustion Co., Toledo, Ohio, has been promoted to the position of sales

C. B. PHILLIPS

F. W. MANKER

manager. He succeeds F. W. Manker, who resigned to become assistant to the president of the Great Lakes Steel Corporation, Detroit. Mr. Manker has also resigned as president of the Industrial Furnace Manufacturers' Association.

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J. E. RESOR, formerly in charge of the Detroit office of the Acme Steel Co., Chicago, has been appointed manager of sales of the strip steel division, with headquarters at 2840 Archer Avenue, Chicago, succeeding W. J. ADAMSON, who recently resigned. WILLIAM A. KINGSLEY has been appointed district manager of

the Detroit office of the company and N. C. McNUTT, special sales representative of the strip steel division, with offices at Chicago.

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GEORGE E. JOHNSON has been placed in charge of the branch office in the Transportation Building, Chicago, of the Saginaw Stamping & Tool Co., Saginaw, Mich.

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STEPHEN S. TUTHILL has resigned as secretary of the American Zinc Institute, 27 Cedar Street, New York, effective Aug. 1.

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JOHN O. TUCKER has resigned as general manager of sales, Wheeling Steel Corporation, Wheeling, W. Va., to go into business for himself in Wheeling. His successor is J. L. NEUDOERFER, who has been general manager of sales of the pipe division of the company.

GEORGE A. BRYANT, JR., has been appointed to the newly created position of executive vice-president of the Austin Co., engineer and builder, Cleveland. Mr. Bryant has been a vice-president of the company. Three regional vice-presidents have also been appointed to represent the company in the Eastern, Northwestern and Chicago districts. J. K. GANNETT has been made regional vice-president of the Eastern district, with headquarters in New York. A. S. LOW has been made vice-president of the Chicago district, with headquarters in that city, and G. W. PLAISTED, vice-president of the Northwestern district, with headquarters in Seattle. These three executives formerly were managers of their respective districts.

Fifty Years a Buyer of Iron and Steel

On May 15 A. W. Glessner, president of the Excelsior Steel Furnace Co., Chicago, celebrated his fiftieth anniversary as a buyer of iron and steel. On that date in 1879 he made his first purchase, placing an order for sheet iron with Joseph T. Ryerson & Son, then located at South Water and Franklin Streets, Chicago. During the half century that has elapsed since that time Mr. Glessner has been a constant buyer of sheets and tin plate, developing into one of the largest purchasers of light sheets in Chicago and the West, and the Ryerson company has become the largest jobber of iron and steel products in the country.

H. W. Caldwell & Son Co., Chicago, Atlanta and Dallas, will exhibit a working model of a screw conveyor complete with drive, as well as other equipment for the cottonseed oil mills, at the conventions of the Oil Mill Superintendents of Georgia Association, Atlanta, June 12 to 14, and the Tri-State Oil Mill Superintendents Association, Memphis, Tenn., June 18 to 21.

OBITUARY

L. GLEN HEWINS, sales manager, Gears & Forgings, Inc., Cleveland, and his wife, were killed May 8 when their automobile was struck by a train at Newcastle, Ind. Mr. Hewins was born at Ashtabula, Ohio, and was a graduate of Denison University, Granville, Ohio. He had been connected with Gears & Forgings and one of its predecessors, the Van Dorn & Dutton Co., for 14 years, having been sales manager of the latter company. He had been deeply interested in better industrial marketing and had devoted considerable of his time in active work among clubs and associations sponsoring this movement. He was 41 years old.

L. G. HEWINS

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SAMUEL W. FOLSOM, for more than 50 years associated with the M. A. Hanna Co., Cleveland, died in New York, May 9, aged 85. He was for a long time assistant treasurer of the Hanna company, from which he retired in 1927.

GEORGE C. COCKBURN, for many years manager of the Republic Structural Iron Works Co., Cleveland, and previously connected with the T. H. Brooks Co., steel fabricator, died May 7, aged 69 years.

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ALLISON R. MAXWELL, vice-president, Pittsburgh Steel Co., Pittsburgh, died at Mercy Hospital in that city on May 7, aged 37 years. He was born at New Orleans, La., and attended college at St. Catherine's, Ont. At Pittsburgh he was first employed at the Homestead works, Carnegie Steel Co. Later he went to the Monessen works of the Pittsburgh Steel Co. as assistant general superintendent. He had been vice-president for only a short time.

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HENRY A. ROSS, president, Ross-Tacony Crucible Co., Tacony, Pa., died at his home in Philadelphia on May 10, aged 63 years.

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ALLAN E. JOHNSON, special engineer for the A. O. Smith Corporation, Milwaukee, died at his home in that city on May 4, aged 55 years. He was formerly connected with the Brown Hoisting Machinery Co., Cleveland; Dominion Bridge Co., Montreal, and Whiting Corporation, Harvey, Ill.

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JOSEPH N. LAPOINTE, for many years connected with the New England machine tool industry as head of the Lapointe Machine Tool Co., Hudson, Mass., and later of the O. N. Lapointe Co., Marlboro, Mass., died of heart failure at New London, Conn., May 4, aged 68 years. Previously, he had been connected with the Pratt & Whitney Co., Hartford, Conn., in charge of experimental work for 14 years.

Record May Production of Automobiles Expected

PHILADELPHIA, May 14.—*Automotive Industries* this week will say:

"While heavy production schedules are being maintained by a large number of automobile manufacturers, especially those producing cars in the lower-priced group, there are indications that the May output is not likely to reach the all-time record established last month, when the factories turned out 633,424 cars and trucks. However, the opinion is not uncommon among students of production trends that a new record for May will be established this year.

"With the normal seasonal peak of sales at hand, manufacturers are closely watching the situation in the field, and are preparing to adjust their production schedules to fit the market. Retail sales continue generally favorable, according to several sales executives of automobile companies, and improved weather conditions in many sections of the country are expected to brighten the outlook."

Office Removals

Wright Mfg. Co., manufacturer of Wright chain hoists, trolleys and cranes, recently moved its New York City offices to the New York Central Building, 230 Park Avenue.

Gathmann Engineering Co., Baltimore, has moved from 4720 Edmundson Avenue to Frederick and Hilltop Roads, where a research laboratory and office building is to be erected. Temporary offices will be occupied for the present.

IRON AGE

Pig Iron Shortage Depends on Coal Supply

British Producers Sold Until Oct. 1—German Steel Dwellings in Demand —Sweden to Ship More Ore

(*By Cable*)

LONDON, ENGLAND, May 13.

CLEVELAND pig iron is quiet, as producers are sold out until the end of September on the basis of the present restricted production schedule. More furnaces would be blown in, but the future raw material situation is uncertain. Present supplies of coal and other fuel are adequate, but it is difficult to arrange for the increased tonnage required for more furnaces.

Domestic and export demand for pig iron is strong and merchants have sold at 9d. (18c.) per ton more than the minimum price schedule. Hematite producers are sold out to June and obtaining their full market prices for July.

Finished steel is quiet but firm, and some sellers are endeavoring to secure more than the fixed prices, especially for shapes. Plate mills are in need of orders, although specifications are coming in more freely. Structural and rail mills are moderately well engaged.

April exports of pig iron were 36,000 tons, of which the United States received 6300 tons. The total iron and steel exports were 340,000 tons. Imports of foreign steel in April increased to 262,000 tons, which probably included accumulations from February and March delayed by the severe weather.

New business in foreign steel is quiet, with spasmodic buying of small lots of semi-finished material. Japan has bought 1600 tons of Continental sheet bars.

Tin plate is moderately active, with mills well booked and considering increased prices based on higher costs of steel and other raw materials. Galvanized sheets are firm, with output restricted, but business is generally quiet. Japanese demand for light gage black sheets is slack, but there have been small sales of the heavier gages.

Bolckow, Vaughan & Co. have secured 9000 tons of rails and accessories for Argentina, and the Metropolitan Carriage, Waggon & Finance Co., Birmingham, 80 all-steel, 90-ton ore trucks for the Bengal-Nagpur Railroad.

J. Beaumont Nielson, deputy chairman of the board, Baldwins, Ltd., has become a director of the English Steel Corporation, which is regarded by many as significant of an impending development in the steel trade.

British Steel Merger May Involve $250,000,000

LONDON, ENGLAND, April 30.—Progress toward the iron and steel merger of which the United Steel Co. is intended to form the nucleus is proceeding satisfactorily. Negotiations have been completed, or are approaching completion, for the acquisition of additional undertakings representing an aggregate purchase price of more than £20,000,000 ($100,000,000). It is believed that the final merger will include assets of not less than £50,000,000 ($250,000,000).

Financial support for the United Steel purchase has already been arranged for, and subsequent financing will presumably depend upon the success attending the new negotiations. Because of the projected size of the consolidation it will probably involve the "Big Five" banks. Ultimately the merger will take the form of a holding company, which will acquire the interests taken over either for cash or exchange of shares.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd	£0	18½s.	to £0	19s.	$4.48	to	$4.60
Bilbao Rubio ore*	1	3			6.18		
Cleveland No. 1 foundry	3	11			17.21		
Cleveland No. 3 foundry	3	8½			16.61		
Cleveland No. 4 foundry	3	7½			16.37		
Cleveland No. 4 forge	3	7			16.25		
Cleveland basic (nom.)	3	7½			16.37		
East Coast mixed	3	13½			17.70		
East Coast hematite	3	14			17.94		
Rails, 60 lb. and up	7	15	to 8	15	37.59	to	42.43
Billets	6	7½	to 6	10	30.91	to	31.52
Ferromanganese	13	15			66.69		
Ferromanganese (export)	13	10	to 14	0	65.47	to	67.90
Sheet and tin plate bars, Welsh	6	5	to 6	7½	30.31	to	30.91
Tin plate, base box	0	18⅛	to 0	18¾	4.45	to	4.53
Black sheets, Japanese specifications	13	7½	to 13	10	64.87	to	65.47
					C. per Lb.		
Ship plates	7	12½	to 8	2½	1.66	to	1.76
Boiler plates	9	0	to 10	10	1.95	to	2.27
Tees	8	2½	to 8	12½	1.76	to	1.86
Channels	7	7½	to 7	17½	1.60	to	1.71
Beams	7	2½	to 7	12½	1.55	to	1.65
Round bars, ¾ to 3 in.	7	12½	to 8	2½	1.65	to	1.76
Steel hoops	9	0	to 10	0	1.95	to	2.16
Black sheets, 24 gage	10	5	to 10	10	2.21	to	2.27
Galv. sheets, 24 gage	13	12½	to 13	15¾	2.94	to	2.98
Cold rolled steel strip, 20 gage (nom.)	12	0			2.64		

*Ex-ship, Tees, nominal.

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	7½s.	to £3	12s.	$16.37	to	$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	9			16.73		
Billets, Thomas	5	4½	to 5	8	25.34	to	26.31
Sheet bars, Thomas	5	7½	to 5	8	26.19	to	26.31
Wire rods, Low C., No. 5 B.W.G.	6	5	to 6	6¼	30.31	to	30.61
Black sheets, No. 31 gage, Japanese	12	12½			61.16		
Rails, 60 lb. and heavier	6	10*			31.52		
Rails, light	6	0			29.10		
					C. per Lb.		
Steel bars, deformed	5	18	to 5	18½	1.28	to	1.29
Beams, Thomas, British standard	5	5½	to 5	7½	1.14	to	1.20
Channels, Thomas, American sections	6	5			1.35		
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	5	10			1.15		
Angles, Thomas, 3-in.	5	14			1.22		
Ship plates, open-hearth, inspected	7	10			1.62		
Hoop and strip steel, over 6-in. base	6	7½			1.38		
Wire, plain, No. 8 gage	7	12½			1.65		
Wire, galvanized, No. 8 gage	9	10			2.06		
Wire, barbed, 4-pt. No. 12 B.W.G.	12	0			2.60		
Wire nails, base	8	0			$1.73 per keg		
Wire nails, assortments, 1 to 6-in. keg	10	10			2.27		

*Open-hearth steel, 7½s. ($1.82) per ton extra.

Austria to Abandon Import Allotments on Motor Cars

VIENNA, AUSTRIA, April 26.—The Government is planning an increase in the import duties on motor cars. Austria is the only European country, with the exception of Russia, which has fixed annual allotments on motor car imports from various countries. These allotments, which do not include trucks, range from 250 to 450 cars annually. The largest imports are permitted from Germany and France. The United States has an allotment of 400 motor cars a year.

This system is to be abandoned and imports to any amount will be permitted, with duties advanced from 35 to 45 per cent ad valorem. There are five motor car builders here, of which three companies, Austro-Daimler, Steyer and Fraef & Stift, are active exporters. The Austro-Daimler is exporting an increasing number of cars to the United States.

German Motor Car Output Rises, But Prices Decline

HAMBURG, GERMANY, April 29.—A total of 290,208 motor cars was produced in Germany in 1928, according to the German Motor Car Dealers' Federation. This total, which does not include the output of assembly plants in Germany, is 39 per cent more than that of 1927. The result of drastic price reductions is reflected in the total value for 1928 of 1,050,000,000 m. ($248,850,000), which was only 21 per cent more than that of 1927.

German Mine Accidents Show Steady Decline

HAMBURG, GERMANY, April 29.—The number of accidents causing more than two days' absence shows a steady decline in the mining industry. The total for 1928 was 128,508 accidents, compared with 136,973 in 1927 and 149,227 in 1926. Casualties declined from 1987 in 1926 to 1929 in 1927 and to 1117 in 1928. The total number of workmen employed by the mines was 617,227 in 1928.

Greece May Buy 7000 Steel Dwellings in Germany

DÜSSELDORF, GERMANY, April 29.—Stahlhaus G.m.b.H. (Steel House, Ltd.), is receiving favorable consideration from the Government of Greece on a proposal to furnish and erect 7000 steel dwellings in the earthquake-devastated area of Corinth. Stahlhaus G.m.b.H. has erected four exhibition dwellings at Athens, and, if it obtains the contract for the 7000 dwellings, expects to complete their erection within two months after their arrival in Greece. Payment for the contract may be charged, in part, to reparations account.

These dwellings, consisting of four rooms, kitchen and bath, are offered at $2,000 each, erected at Corinth. The company has built a number at Salonika and is already heavily booked with export orders. Should it receive the Corinth contract, it will be necessary to build a new shop. The steel houses are now being constructed with special wall insulation, which does not readily conduct extremes of heat and cold.

Belgian Car Builders Form Export Syndicate

ANTWERP, BELGIUM, April 29.—Builders of railroad cars and locomotive tenders, including Luxemburg shops, have formed an export syndicate. The new association will control the distribution of export business among its members. In 1928, Belgian builders exported railroad cars and tenders to a total of 361,463 tons and valued at 125,600,000 Belgian fr. ($17,420,720). The largest customer for this equipment was South America, 55,317 tons going to Argentina, 55,901 tons to Brazil, 11,877 tons to Uruguay. South African railroads received 36,387 tons.

Large Swedish Iron Ore Exports to United States

STOCKHOLM, SWEDEN, April 27.—A total of 2,100,000 tons of iron ore will be shipped through Lulea by the Luossavaara Kirunavaara A.B. from May to September, when that port is free from ice. According to the announcement of the company, about one-half the total exports will be consigned to the United States and Canada.

Rail Cartel to Be Known as "International"

HAMBURG, GERMANY, April 29.—It has been officially announced that the European Rail Makers' Association (ERMA) will in the future be known as the International Rail Makers' Association (IRMA). The first meeting of the renewed cartel will be held at Brussels or London in June. An increase in the official price of rails will be discussed in response to urging by the British and some Continental members.

The report published in the European press that Germany in the new rail cartel had been allotted 275,000 tons of rails annually for shipment on reparations account is an error. German mills shipped only 20,000 tons of rails on reparations account in 1928, and the actual allotment in the new cartel is 27,500 tons annually.

Sharon Steel Hoop Co. recently started operation of its new 14-in. continuous hot strip mill at Sharon, Pa., consisting of 11 stands. The unit was installed by the Morgan Engineering Co., Worcester, Mass.

National Factory Show to Be Held in Chicago

Arrangements have been completed for the first showing of the American Factory and Industrial Production Exposition, to be held in Chicago in the early part of 1930. It is the intention to make this exposition one of outstanding interest and great commercial benefit to manufacturers of equipment, superintendents, operators and executives in the great and important field of factory construction, operation, management and production.

The National Factory Show, as it will be called, will cover numerous and varied types of equipment for use in factory operation, as well as a great number of advanced ideas entering into factory construction and production problems. The exhibition will not include any special class of machinery or fabricating equipment which might be termed individual for one class of operation, but it will endeavor to include all those essential features of construction, management, operation and production which might be applied to the so-called average American factory, irrespective of its output or product. The list will include the following:

1. Factory locations
2. Layouts, designs, engineering
3. Construction, materials, appliances
4. Power connections, switches, lighting appliances
5. Heating, ventilating, service connections
6. Sanitation, hygiene, lockers, health features
7. Office design, personal equipment, instruction rooms, display rooms
8. Materials handling, conveyors, cranes, tractors, trailers, assembly lines
9. Power transmissions, belts, pulleys, motors, transmissions and appliances
10. Safety devices, aids, campaign, instruction, etc.
11. Management, time study, production control systems and methods, labor-saving devices, budgets and finance
12. Maintenance methods, supervision, appliances
13. Employee savings plans, accountancy methods, equipment and appliances
14. Receiving and shipping methods, package design, routing and allied problems
15. Building units and expansion equipment
16. Research, laboratory and experimental divisions
17. Banking, insurance, legal matters
18. Architectural treatment, beautification

Plant of the National Steel Castings Co., Montpelier, Ind., has been purchased for $16,000 at a receiver's sale by Max Ziegler & Brothers, Muncie, Ind., scrap dealers.

Much Larger Construction Volume in April

New construction work east of the Rocky Mountains in April reached the largest total since last June, according to F. W. Dodge Corporation, and was close to the April figure for 1928. The total in 37 States is given as $642,060,000. This brings the aggregate for the first four months to $1,897,890,000, which is 11 per cent less than for the corresponding period last year.

The April total was 32 per cent ahead of March. It included $256,780,000 for residential buildings, $152,127,000 for public works and utilities, $77,988,000 for commercial buildings and $68,230,000 for industrial projects.

In the Middle Atlantic States (eastern Pennsylvania, southern New Jersey, Maryland, Delaware, District of Columbia and Virginia) the April construction contracts were the largest ever recorded for any month. The aggregate was $106,137,000.

Smaller Value in Wire Products Made in 1927

WASHINGTON, May 14.—Production of iron and steel wire in 1927 totaled 2,865,223 net tons, a decrease of 3.3 per cent as compared with 2,963,236 tons in 1925, according to the Bureau of the Census. Total production of copper wire in 1927 was 393,282 net tons; of brass wire, 31,965 net tons; and of other non-ferrous wire, 20,509 net tons. No comparable statistics are available for these three items for 1925. The total value of wire and wire products reported for 1927 by all establishments manufacturing such commodities amounted to $693,742,017, a decrease of 1.2 per cent as compared with $702,038,644 reported for 1925.

Production of bare wire in 1927 (exclusive of wire made and consumed in the same works in the manufacture of finished wire products) was made up as follows: Plain iron and steel wire, 907,089 tons, valued at $67,618,843; galvanized iron and steel wire, 249,671 tons, $17,034,950; other coated iron and steel wire, 44,924 tons, $6,368,147; cold-rolled flat iron and steel wire, 149,803 tons, $18,543,650; plain copper wire, 491,818,866 lb., $77,090,340; plain brass wire, 60,843,568 lb., $11,693,125; wire made of bronze and other non-ferrous alloys, except brass, 33,809,861 lb., $11,908,766.

Value of products manufactured from wire in 1927 aggregated $483,484,196, an increase of 1.3 per cent as compared with $477,475,795 reported for 1925. The more important items included in the total for 1927 were as follows: Products made from iron and steel wire—nails and spikes, 14,811,194 kegs (of 100 lb.), valued at $47,930,522; staples, 49,379,225 lb., $1,596,600; brads and tacks, 7,134,501 lb., $690,796; barbed wire (plain and coated), 201,708 tons, $12,973,239; woven-wire fence and poultry netting, plain and coated, $43,738,836; wire cloth, $14,225,293; other woven wire, $5,442,364; rope, cable and strand, $46,882,071; wire springs, $30,334,854; bale ties, 129,750,911 lb., $4,564,408. Products made from non-ferrous wire—insulated wire and cable, $209,703,970; copper-wire cloth, $2,212,939; wire cloth made principally from brass and bronze wire, $6,583,138.

Manufacture of wire and wire products in 1927 was reported by 768 establishments, of which 73 were mills drawing wire from purchased rods or bars, 38 were wire-drawing departments of steel works and rolling mills, 20 were wire-drawing departments of brass and copper rolling mills and other establishments, and 637 did no wire drawing, but were engaged in fabricating purchased bare wire into finished wire products. The 131 wire-drawing plants were distributed as follows: 24 in Pennsylvania, 17 in Massachusetts, 16 in Illinois, 14 in New Jersey, 13 in Ohio, 12 in Connecticut, 11 in New York, five in Indiana, four in Wisconsin, three in Rhode Island, three in Michigan, two in Alabama, and one each in California, Colorado, Georgia, Maryland, Minnesota, Missouri and Montana.

A Correction

In the report of the sessions on malleable iron at the convention of the American Foundrymen's Association in April, two errors were made. On page 1075 of THE IRON AGE of April 18 the expression "to anneal 400 lb. per ton of coal," should have read "400 lb. of coal per ton." The cross-head, "More Trouble from Hard Than from Tough Castings," should have been "More Trouble from Tough Than from Hard Castings."

Demand Keeps Steel Production Up

(*Concluded from page* 1354)

creased, but much less than the usual seasonal decline. In comparison with the estimated normal for the month, the index is 130, that is, 30 per cent above normal. This is the first time it has exceeded the 1923 peak, when it was a little over 122. We have now had a 50 per cent increase in the annual rate of steel production since the low point in November, 1927. While it is to be remembered that this means a very high level and an unusually rapid industrial tempo, it is still true that the production is not out of line with indicated current requirements.

High Production Seems Needed

THAT steel production is not actually excessive as compared with demand is indicated by the continued firmness of prices. The average price of finished steel was actually a little higher in April than in March. The increase in unfilled orders during April, too, was contrary to the usual seasonal trend, indicating that thus far new business has continued to exceed shipments. The adjusted curve of unfilled orders is the highest since February, 1926.

Average daily pig iron production increased in April, although it usually declines a little in that month. Our adjusted index is now more than 20 per cent above normal, and represents an increase above the 1927 low point of nearly 30 per cent. Allowing for normal growth and seasonal variation, it is the highest since February, 1925.

Pig Iron Prices May Hold

According to all precedent, pig iron production is too high to be long maintained. It was maintained at present levels for only four months in 1923 and for one month in 1925. However, it may be noted that steel production is now high in comparison with pig iron output. Considering the season, production of pig iron has shown no gain on steel production. Moreover, pig iron prices, although averaging a little higher in April, are still low compared with steel or scrap.

In spite of high production, therefore, pig iron prices seem likely to be maintained for at least another month and possibly may show some advances. Ultimately, however, the production must be reduced, and a decrease in production will probably be attended by a decline in prices.

No Sharp Advances in Sight

THE iron and steel price structure is now quite similar to that which developed during the brief period of stabilization in the fall of 1926. Prices of billets and nails are the same as then, and bars are almost as high (1.95c. against 2c. then). Sheets, however, are considerably lower. The same is true of pig iron, and it seems probable that the normal spread between sheets and semi-finished steel or pig iron has become less than it formerly was. One of the chief differences is found in coke, which in the fall of 1926 sold at $3.50 to $4 a ton, against only $2.75 now. Scrap prices are considerably higher also.

One thing may be said, namely, there is no possibility of such advances as developed in late 1922 and early 1923. Unfilled orders then were large and production relatively low. At that time, sheets led the advance. Bars ran up to over $55 a ton, billets jumped sharply to $45, and pig iron sold for over $30.

It seems probable that steel scrap, which is still abnormally high, will continue to decline, that pig iron prices, after some irregularity, will follow suit—probably in June. Pig iron, however, does not seem likely to decline much for several months at least, as it is cheap in comparison with other items and is not out of line with coke.

Finished steel prices seem likely to hold firm for several months—possibly until about August.

Machinery Markets and News of the Works

Gradual Recession in Buying

Machine Tool Volume in April Declines Slightly but Unfilled Orders Gain

NOTHING is in sight to indicate a marked falling off in machine tool business. On the contrary, present prospects are so good that a steady, though perhaps slightly lower, volume is probable through the summer months. Whatever recession may occur will undoubtedly be gradual. There has, in fact, been a slight decline in the past two months, according to the tabulations made by the National Machine Tool Builders' Association. April orders were a little below those of March, which in turn were lower than February business. However, the three months' average of February, March and April showed an increase because April orders were larger than those of January.

"Unless there should be a new spurt in orders in May," says the association, "we may expect the three months' average curve to turn down slightly in May, indicating the beginning of the usual summer recession."

A significant thing, however, is that shipments continue to lag behind orders, although machine tool plants are working at maximum capacity in most cases. Unfilled orders have gained, now being equal to 2.31 times the April shipments. That machine tool plants will operate well during the summer is now certain, some companies having orders for fall shipment.

Although buying by the automobile companies has receded, the railroads have become a more promising source of business. The St. Paul road has bought eight engine lathes, the Chesapeake & Ohio is expected to complete its large purchases before the end of the month, and action on the sizable list of the Delaware, Lackawanna & Western is probable within two weeks. The Union Pacific has issued an inquiry for about 20 tools. Miscellaneous buying in small lots is being done by the Rock Island, Chicago & North Western and Santa Fe.

The Youngstown Sheet & Tube Co., Youngstown, has bought about 10 machines. The Chase Brass & Copper Co. is buying at Bridgeport, Conn., for its new Cleveland plant. The Western Electric Co. will probably be a large buyer for its $25,000,000 plant to be built in Baltimore. Announcement that the Pratt & Whitney Aircraft Co. will build a new plant at Hartford, Conn., for expansion of its airplane engine output probably means the purchase of shop equipment by that company.

The Sikorsky Aviation Corporation has bought a list of tools for its new plant at Bridgeport, Conn.

Foreign business still looms large. At least two European automobile manufacturers have representatives in this country who are considering the purchase of large lots of tools. A committee representing the Soviet government is here for an indefinite stay to select equipment for a new tractor works in Russia.

New York

NEW YORK, May 14.—While business in some lines of machine tools has been a little quieter so far this month than in the corresponding period of April, the amount of business pending and likely to be closed this month gives reasonable assurance that there will be no marked falling off in total sales in May, as compared with April. Two developments that spell large machine tool purchases within the next few months are the beginning of construction of a $25,000,000 plant at Baltimore for the Western Electric Co., and the announcement that the Pratt & Whitney Aircraft Co., Hartford, Conn., has obtained options on 500 acres of land on which a new plant with 500,000 sq. ft. of floor space will be erected for the manufacture of Wasp and Hornet airplane engines. Textile equipment manufacturers in New England have received orders for about $1,000,000 worth of machinery for a tire fabric mill. The General Electric Co. is again sending out inquiries for tools for its Schenectady works. Action on the recent large inquiry of the Delaware, Lackawanna & Western Railroad is expected within a week or two.

Contract has been let by Metal Hose & Tubing Co., 253 Tillary Street, Brooklyn, to Mathew Narsilla, Maspeth, L. I., for two additions, one and three stories, to cost about $65,000 with equipment. Albert Ullrich, 373 Fulton Street, is architect.

Meurer Steel Barrel Corporation, Hayward Street, Long Island City, has awarded general contract to Austin Co., New York, for a one-story plant, 175 x 300 ft., with two-story office section, at Newark, N. J., to cost over $100,000 with equipment.

Officials of American Brown Boveri Electric Corporation, 420 Lexington Avenue, New York, have organized a subsidiary, American Brown Boveri Co., Inc., to take over and operate all properties devoted to electrical and mechanical products, exclusive of shipbuilding, the latter to be carried on as heretofore at Camden, N. J. New subsidiary will operate Conduit Electrical Mfg. Co., Hyde Park, Boston, and other works, including those for heavy equipment manufacture. George A. Burnham is president of new company, and Joseph T. Graham, secretary and treasurer.

Frank S. Parker, 119 West Fifty-seventh Street, New York, architect and engineer, has filed plans for seven-story automobile service, repair and garage building, 200 x 200 ft., to cost about $900,000 with equipment.

Procter & Gamble Mfg. Co., Port Ivory, Port Richmond, S. I., has let contract for three-story unit, 100 x 110 ft., to H. K. Ferguson Co., Cleveland, to cost about $125,000 with equipment.

S. Parisi, 1611 Hendrickson Street, Brooklyn, has awarded general contract to Del Gaudio Construction Co., 184 Adelphi Street, for two-story ice-manufacturing plant at Corona, L. I., to cost over $150,000 with machinery. Burke & Olsen, 32 Court Street, are architects.

Board of Education, Park Avenue and Fifty-ninth Street, New York, is having plans drawn for new vocational and continuation school at St. George, S. I., to cost more than $1,000,000 with equipment. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is school architect.

Cushman's Sons, Inc., 290 West End Avenue, New York, operating bakeries, is planning service, repair and garage building at Rockaway, N. Y., for company trucks and cars, to cost $100,000 with equipment. R. F. Jacobus, 511 Fifth Avenue, New York, is architect and engineer.

Harbor Marine Steel Corporation has been organized to take over and consolidate R. G. Harry, Inc., 136 Liberty Street, New York, manufacturer of iron and Steel products, and Key City Bolt & Spike Works, Inc., Bayonne, N. J., manufacturer of heavy marine hardware, bolts, spikes, etc. New company plans expansion. R. B. Morse is chairman of board; and R. G. Harry, president.

Northern Mfg. Co., 371 Ogden Street, Newark, manufacturer of radio tubes and equipment, is planning expansion. Company is arranging for sale of 65,000 shares of stock, part of fund to be used for work.

American Platinum Works, Inc., 231 New Jersey Railroad Avenue, Newark, has plans for one and one-half story addition, 40 x 125 ft., to cost $50,000 with equipment. Frederick A. Phelps, 21 Fulton Street, is architect and engineer.

Jersey City Airport, Inc., recently organized, care of Arthur Potterton, director, department of parks, City Hall, Jersey City, N. J., has leased tract at Droyer's Point, Newark Bay, as site for airport and seaplane base. Plans are under way for construction of hangars, repair shops, oil storage and other units, including ramps for landing bases for seaplanes, to cost more than $250,000.

Gold Seal Mfg. Co., Inc., 127 South Fifteenth Street, Newark, manufacturer of radio tubes and equipment, has arranged for purchase of Rosasco Mfg. Co., 267 Wyckoff Street, Brooklyn, manufacturer of kindred apparatus, and will consolidate. Company has work in progress on addition to first-noted plant. Brooklyn plant will be continued and improvements made for expansion.

Thompson Products, Inc., Clarkwood Road, Cleveland, manufacturer of automobile equipment, valves, etc., has leased one-story building at 63 McClellan Street, Newark, for factory branch and distributing plant.

John Hewitt Foundry Co., 17-29 Sherman Avenue, East Newark, N. J., gray iron and non-ferrous castings, has purchased West Hudson Foundry & Pattern Co., Inc., Kearny, N. J. John Hierwarter, former president of Kearny firm, is now in charge of the non-ferrous department of Hewitt company.

Culbert Pipe & Fittings Co., Jersey City, has opened a branch store and warehouse at 166 Clay Street, Paterson, N. J., under management of William H. Merrick.

New England

BOSTON, May 13.—With the first two weeks of May practically past, dealer's sales for the month will probably fall below those for April. New inquiries have dropped and old prospects give no evidence of buying while deliveries are so far extended. The upward tendency of machine tool prices also is a factor in curtailing purchasing. An advance of 10 to 15 per cent on one line of hobbing machines has been announced.

Sales are scattered and in new tools are confined largely to planers, drilling machines, jig boring machines, lathes, boring mills and grinding equipment. In used tools, upright drills, shapers and miscellaneous small equipment have been in demand. Worcester and Connecticut Valley manufacturers were the most active buyers the past week.

O. K. Tool Co., Inc., 33 Hull Avenue, Shelton, Conn., has plans for an addition.

The Crane Market

BUYING of overhead and locomotive cranes is still rather limited, but there is a substantial volume of pending business, particularly in overhead cranes. Hoist manufacturers are well engaged with orders and in some instances are offering deliveries of five weeks or more. A barge company in the New York district has placed an order for a special gantry crane to be mounted on a barge for handling cargo. If this experimental crane proves successful, it is expected that upward of 50 barges will be similarly equipped. The Chesapeake & Ohio Railroad, which recently closed on 21 overhead cranes has a short list of small capacity cranes and hoists pending.

In the locomotive crane field, among several inquiries by New York City contractors is a list of crawl tread cranes and shovels to be bought by the Corson Construction Co., which has a large subway contract in Brooklyn. The New York Central Railroad is reported to have closed on a 15-ton crawl tread crane for Cleveland.

Providence, R. I., is in the market for a crane at its incinerator plant and specifications will be made public soon. Frank E. Waterman is Commissioner of Public Works.

Among recent purchases are:

Pepper Brothers, contractors, Syracuse, N. Y., crawl-tread crane with 2½-cu. yd. bucket from Link-Belt Co.

City of Syracuse, N. Y., 15-ton crawl-tread crane, equipped with hoe, from Browning Crane Co.

Shell Petroleum Corporation, St. Louis, 7½-ton, 29-ft. span, 3-motor overhead crane from H. D. Conkey & Co.

Union Carbide Co., Niagara Falls, N. Y., 5-ton, 16-ft. span, single I-beam hand power crane from H. D. Conkey & Co.

Priester Construction Co., Davenport, Ia., 5-ton, 34-ft. span and 3-ton, 19-ft. span, hand power cranes from H. D. Conkey & Co.

Gulf Public Service Co., Jacksonville, Tex., 10-ton, 38-ft. 10¾-in. span, hand power crane from H. D. Conkey & Co.

Western Electric Co., Chicago, 2-ton, mast type, jib crane from H. D. Conkey & Co.

Des Moines Steel Co., Des Moines, Ia., 7½-ton, 16-ft. 3-in. span, hand power crane from H. D. Conkey & Co.

Kimball Pump Co., Los Angeles, 5-ton, 37-ft. span, hand power crane from H. D. Conkey & Co.

Adams Co., Dubuque, Iowa, 2-ton, 11-ft. span, hand power crane from H. D. Conkey & Co.

Chicago, Rock Island & Pacific, 4-motor, 72-ft. span overhead crane from Middle Western builder.

Columbia, Mo., 40-ton, 1-motor, power house crane from Shaw Electric Crane Co.

Missouri Pacific Railroad, Poplar Bluffs, Mo., 10-ton, roundhouse crane from Shaw Electric Crane Co.

Johns-Manville Corporation, Waukegan, Ill., 5-ton, 50-ft. span overhead crane from Wisconsin builder.

Hartford Builders' Finish Co., Inc., 34 Potter Street, Hartford, has plans for a three-story addition, 75 x 85 ft. Woodworking equipment will be required.

Arthur W. Osburg, 508 Main Street, Manchester, N. H., is taking bids on a two-story cutting and polishing plant for Maine & New Hampshire Granite Corporation, Redstone, N. H. Miscellaneous equipment will be required.

Worcester Wire Works, Inc., 230 Ludlow Street, Worcester, Mass., has started work on a two-story addition, 60 x 90 ft.

General contract has been awarded by Southington Hardware Co., Southington, Conn., for a three-story addition, 52 x 106 ft.

Sanitary Ice Corporation, 24 Westland Avenue, Springfield, Mass., is about to start construction on a one-story, plant, 52 x 216 ft. Miscellaneous equipment will be required. John E. Madden, 21 Elm Street, Springfield, is in charge.

Work will soon begin on a one-story addition for the L. Lindstrom Tool & Toy Co., 50 Silliman Avenue, Bridgeport, Conn.

Lockwood Greene, Inc., 1 Pershing Square, New York, is preparing plans for a two-story plant addition, 50 x 80 ft., for *Holyoke Daily Transcript*, 180 High Street, Holyoke, Mass. Motors will be purchased.

Hendey Machine Co., Torrington, Conn., has started work on a one-story and basement addition, 80 x 300 ft.

Kings County Foundry Co., Fairfield Avenue, Stamford, Conn., has plans for a two-story addition, 50 x 100 ft., to cost about $30,000 with equipment. Charles D. Montague, Stamford, is architect.

Boston & Albany Railroad Co., South Station, Boston, has plans for new engine house, with repair facilities and power plant at Beacon Park Yards, Allston, to cost over $100,000 with equipment.

Raytheon Mfg. Co., Maple Street, Newton, Mass., manufacturer of radio equipment, tubes, etc., plans two-story and basement plant, to cost $60,000 with equipment.

Hedstrom Union Co., Main Street, Gardner, Mass., manufacturer of infants' vehicles, etc., has asked bids on general contract for a three-story addition, 60 x 100 ft., to cost more than $85,000 with equipment.

Whittelsey Mfg. Co., Inc., Bridgeport, Conn, manufacturer of automobile bodies, airplanes, etc., is disposing of a stock issue to total $2,500,000, part of fund to be used for expansion in manufacture of land and seaplanes, under patent and production rights secured from A. V. Roe & Co., Ltd., England.

Agar Mfg. Corporation, Somerville, Mass., manufacturer of corrugated board products, has awarded general contract to Chase & Gilbert, 250 Stuart Street, Boston, for one-story addition, 50 x 250 ft., to cost more than $90,000 with equipment.

Boston, Worcester & New York Street Railway Co., Worcester, Mass., will make extensions and improvements in power plant at Framingham, Mass., including installation of machinery.

Manufacturers Finishing Co., Waterbury, Conn., has been organized with capital of $50,000 to do electroplating and japanning. It has leased space in old Matthews-Willard plant, having moved from 29 Jefferson Street.

Philadelphia

PHILADELPHIA, May 13.—Contract has been let by Brown Instrument Co., Roberts and Wayne Avenues, Philadelphia, manufacturer of pyrometers and other measuring instruments, to Robert E. Lamb Co., 843 North Nineteenth Street, for two-story and basement addition, 79 x 216 ft., to cost about $200,000 with equipment. Completion is scheduled early in September. Ballinger Co., 105 South Twelfth Street, is architect and engineer.

Max Balter, 1536 Callowhill Street, Philadelphia, operating an automobile and radiator repair works, including parts department, has leased entire building at 1422 Fairmount Avenue, for establishment of new plant.

Officials of Philip Cass & Co., 40 Nortn Fifth Street, Philadelphia, manufacturers of electrical equipment and fixtures, have organized Philip Cass Co., Inc., with capital of $200,000, to take over and expand present plant and business. Philip Cass and W. R. Donachy head new company.

Frank A. Cruice, Twenty-first and Ridge Streets, Philadelphia, manufacturer of mantels and kindred products, has plans for two-story addition, 80 x 128 ft., to cost about $40,000 with equipment. Franklin D. Edmunds, Real Estate Trust Building, is architect.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to United Engineers & Constructors, Inc., 112 North Broad Street, for seven-story storage and distributing plant, 184 x 481 ft., on Thirty-second Street, to cost $2,500,000 with equipment.

F. G. Vogt & Sons, Inc., Thirtieth and Race Streets, Philadelphia, meat packer, will soon take bids on general contract for three and four-story plant, to cost about $1,000,000 with conveying and other machinery. C. B. Comstock, 110 West Fortieth Street, New York, refrigerating engineer, is in charge.

Union Battery Co., 2717 South Troy Street, Chicago, manufacturer of electric storage batteries, parts, etc., has purchased plant of Six Wheel Co., B Street and Pennsylvania Railroad, Philadelphia, one story, with about four acres of land, for $230,000, and will use for branch factory for Eastern trade.

Victor Metal Aircraft Corporation, 1204 West Jersey Building, Camden, N. J., is closing arrangements for purchase of 1-acre tract near city for new plant to manufacture all-metal airplanes to sell at popular price. Initial works will consist of two one-story units for assembling and motor-testing, including parts production, to cost more than $80,000 with equipment. Company was organized recently with capital of $250,000. Earl A. Cryne is president.

C. V. Hill & Co., Inc., 360 Pennington Avenue, Trenton, N. J., manufacturer of refrigerators, has awarded general contract to William Burton & Son, Klockner Road, for one-story addition, to cost about $25,000 with equipment.

duPont Motors, Inc., Commerce and Dock Streets, Wilmington, Del., Manufacturer of automobiles, has awarded general contract to E. R. Hall, Wilmington, for one-story addition.

Allentown School District, Allentown, Pa., is asking bids on general contract until May 20 for three-story addition to vocational high school, to cost $425,000 with equipment. Ruhe & Lange, 10 North Sixth Street, are architects; Runyon & Carey, 33 Fulton Street, Newark, N. J., are mechanical engineers.

Officials of New York Wire Cloth Co., York, Pa., and Celluloid Corporation, 290 Ferry Street, Newark, N. J., have formed joint subsidiary under name of Vitalite Co., to manufacture wire cloth of fine mesh, coated with a special composition to form a flexible wire glass. It is understood that production facilities will be arranged at plant of first-noted, which has New York offices at 342 Madison Avenue. L. D. Root, treasurer of New York Wire Cloth Co., is president of new subsidiary, and W. S. Landes, vice-president, holds same office with Celluloid Co.

South Atlantic

BALTIMORE, May 13.—Superstructure will begin by Berliner-Joyce Aircraft Corporation, Hearst Tower Building, Baltimore, on initial buildings for new plant on 5-acre tract, comprising one-story units for parts production and assembling, to cost about $250,000 with equipment. Present plant at Alexandria, Va., will be removed to new location. W. W. Moss is president.

Board of Trustees, Morgan College, Arlington Avenue, Baltimore, is having plans drawn for three-story industrial building, to cost $120,000 with equipment. E. L. Tilton, 141 East Forty-fifth Street, New York, is architect.

Easton Utility Commission, Easton, Md., is asking bids until May 27 for one air injection full Diesel engine, direct-connected to a.c. generator, three-phase, sixty-cycle, with accessories, for installation in municipal electric light and power plant.

Independent Can Co., Ostend and Howard Streets, Baltimore, has plans for one-story addition, to cost about $30,000 with equipment. Clark Construction Co., American Trust Building, is architect and engineer.

Baltimore & Ohio Railroad Co., Baltimore, is planning extensions in engine house and shops at New Castle, Pa., including installation of additional equipment, to cost about $130,000.

Cambridge Mfg. Co., Cambridge, Md., is said to be planning to rebuild part of woodworking plant and saw mill, recently destroyed by fire.

Kreider-Reisner Aircraft Co., Hagerstown, Md., recently purchased by Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, has awarded general contract to Aaron Beecher, 7 Magnolia Avenue, for one-story addition, 120 x 260 ft., with two 30-ft. bays, and two-story office building, to cost over $85,000 with equipment.

Searchlight Metals Mfg. Co., P. O. Box 705, Richmond, Va., has awarded general contract to H. L. Kulp, 12 Raines Avenue, for two one-story units, 45 x 130 ft., on local site, for production of brass and copper specialties, babbit metal, etc., to cost over $45,000 with equipment.

Philip S. Tyre, 114 South Fifteenth Street, Philadelphia, architect, is completing plans for two-story automobile service, repair and garage building at Baltimore, to cost about $150,000 with equipment.

Georgia Power Co., Atlanta, Ga., is completing plans for construction of new steam-operated electric generating plant on Chattahoochee River, near city, to cost over $3,000,000 with machinery and transmission lines. Work will be carried out under direction of Empire Construction Co., Electric & Gas Building, Atlanta, a subsidiary. Company is operated by Southeastern Power & Light Co., Birmingham.

Hy-Grade Manganese Co., Woodstock, Va., is reported planning construction of grinding mill in connection with general expansion program now in progress, to cost $200,000. Charles W. Massie is manager at plant, in charge.

Virginia Electric & Power Co., Richmond, Va., will increase capital from 480,000 to 580,000 shares of stock, no par value, majority of proceeds to be used for extensions and improvements.

Pittsburgh

PITTSBURGH, May 13.—Machine tool business is showing marked improvement, particularly in new inquiry. Orders have been largely for one or two tools, but the aggregate is more satisfactory, although buyers are still rather slow in closing on old inquiries. The Westinghouse Electric & Mfg. Co. is asking for several tools in addition to its regular second quarter list against which it is buying steadily.

Orders have been placed in this district the past week for rolling mill equipment for extensions to the plant of the Gulf States Steel Co., Birmingham. Inquiry for cranes and other equipment needed for the new seamless tube mill at the McKeesport works of the National Tube Co., will probably not be made until about July 1.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has purchased 80-acre tract at Santa Ana, Cal., as site for new sheet glass plant, for which plans will be drawn at once; erection is scheduled to begin within 60 days. Main unit will be one-story, 400 x 2600 ft., with boiler plant, machine shop and other units, to cost $3,500,000 with machinery. Company will also develop glass sand deposits in vicinity for raw material supply.

C. Edward Smith Hardware Co., New Castle, Pa., has purchased plant and business of Banner-Mahoning Furnace Co., Youngstown, manufacturer of heating furnaces, etc., and will remove plant to New Castle works, where additional facilities will be provided for furnace production, including a new heating unit now being developed by purchasing company, to be marketed under name of Castle.

Overhead Door Co., Lewistown, Pa., has plans for one-story addition, to cost about $20,000 with equipment.

Viking Oil Corporation, Clarendon, Pa., manufacturer of lubricating and other refined oils, has arranged for stock issue to total $558,000, part of proceeds to be used for expansion.

Steel City Electric Co., 1207 Columbus Avenue, Pittsburgh, manufacturer of electrical equipment and supplies, has awarded general contract to W. F. Trimble & Sons, 1719 Penn Avenue, for two-story top addition, 40 x 145 ft., to cost over $65,000 with equipment.

Pittsburgh Screw & Bolt Corporation, Preble Avenue, Pittsburgh, has begun production of hollow steel airplane propellers, a new branch of output for company, and will provide facilities for maximum output of 200 complete units per month. Regular production of bolts, studs, nuts, etc., will be continued.

T. J. Underwood, county controller, Court House, Washington, Pa., will re-

ceive bids until May 21 for one full revolving crawler type gasoline shovel, with standard boom and bucket of ½-cu. yd. capacity; one 120-cu. ft. air compressor, mounted on four steel wheels, with jack hammer attachment.

Buffalo

BUFFALO, May 13.—Plans are under way by Trico Products Corporation, 817 Washington Street, Buffalo, manufacturer of automatic windshield cleaners and other automobile accessories, for addition, to cost about $100,000 with equipment.

City Council, Buffalo, Nat E. Duffy, City Hall, airport director, is considering construction of seaplane hangar with repair and reconditioning facilities at Lake View Park, to cost $50,000 with equipment.

Frank H. Betz, 266 Lisbon Avenue, and Donald E. Hettrick, 3033 Main Street, Buffalo, have organized B. & H. Tool & Stamping Co., with capital of $25,000, and plan early operation of local plant to manufacture tools and machine parts.

Niagara Falls Motoramp Garage, Inc., Niagara Falls, N. Y., recently organized by A. C. Deuel, Lewiston Heights, Niagara Falls, and associates, will soon begin superstructure for multi-story automobile service, repair and garage building, to cost about $300,000 with equipment. Kirkpatrick & Cannon, 503 Third Street, are architects and engineers.

Following recent purchase of Ames Pump Co. and Heat Transfer Products Co., both identified with Staten Island Shipbuilding Co., New York, by American Locomotive Co., 30 Church Street, New York, plans have been arranged for use of Brooks Works, Dunkirk, N. Y., for these new subsidiary lines of production. Other lines of similar output, it is stated, will be developed at that plant. New locomotive production is being concentrated at Schenectady, N. Y., works.

Detroit

DETROIT, May 13.—Contract has been let by Oakland Motor Car Co., Pontiac, Mich., to Christman-Burke Co., Fisher Building, Detroit, for one-story addition, to cost about $135,000 with equipment.

American Spring & Mfg. Co., Holly, Mich., is said to be planning one-story addition, to cost about $20,000 with equipment.

Charles B. Bohn, president, Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, and associates are organizing Simon Airplane Appliance Co., with capital of 60,000 shares of stock, no par value. New company will be consolidated with Heywood Starter Co., Detroit, manufacturer of high pressure starters for aircraft service. Later another company will be formed under name of Airplane Equipment Co., capitalized at 200,000 shares of stock, no par value, to take over last two noted interests and develop facilities for manufacture of airplane equipment and accessories. Mr. Bohn will head new organization.

Pressed Metals of America, Inc., Port Huron, Mich., has begun work on one-story addition, and will carry out other expansion to double present output, to cost over $100,000 with equipment.

Sparks-Withington Co., Jackson, Mich., manufacturer of radio equipment, has work in progress on new unit primarily for production of light metal punchings, to cost more than $150,000.

Board of Education, Flint, Mich., is considering installation of manual training department in new two-story junior high school to cost $220,000, for which plans will be drawn by Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, architects.

Robert B. Gotfredson, Detroit, formerly vice-president of Gotfredson Truck Corporation, and associates, have organized Robert Gotfredson Truck Corporation, to operate a plant at 3599 Gratiot Avenue for manufacture of motor trucks, including parts and assembling departments. L. R. Richards is also interested in new organization.

Hudson Motor Car Co., Gratiot Avenue, Detroit, has plans for one-story addition, 95 x 320 ft., to cost about $150,000 with equipment. A crane runway will be installed. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Clark Transmission Co. has been organized as subsidiary of Clark Equipment Co., Buchanan, Mich., and will take over manufacture of automotive transmissions. Manufacturing will be done in Clark plant at Berrien Springs, Mich., and purchasing will be handled for present at Buchanan.

Miner & Leatherman Co., Coldwater, Mich., has been organized to manufacture topographic and traverse instruments and has factory fully equipped. These instruments will be distributed through Keuffel & Esser stores.

Cleveland

CLEVELAND, May 13.—Machine tool sales continue good, the volume being about the same as in the previous few weeks but somewhat lower than that of March. Inquiry is quite plentiful, but long extended deliveries are proving somewhat of a handicap to the placing of orders. Business is well distributed among the metal working industries. However, not much is coming from the automotive industry either in Cleveland or Detroit.

Youngstown Sheet & Tube Co. during the week purchased about 10 machines including 24 to 36-in. lathes, radial drills and shapers. Lycoming Mfg. Co., Williamsport, Pa., which is buying equipment to manufacture airplane motors, bought eight turret lathes from a Cleveland manufacturer. Chase Brass & Copper Co. is purchasing equipment for its new Cleveland plant through its headquarters in Bridgeport, Conn. Hupp Motor Car Corporation continues to buy small lots of equipment for its Cleveland plant.

Plans have been filed by Cleveland Trencher Co., 20100 St. Clair Avenue, Cleveland, manufacturer of excavating and kindred heavy machinery, for one-story addition, 65 x 80 ft., to cost $35,000 with equipment.

Ohio Crankshaft Co., 6600 Clement Avenue, Cleveland, will soon begin construction of one-story addition, 35 x 120 ft., to cost over $40,000 with equipment.

Officials of Toledo Scale Co., Toledo, Ohio, have organized Toledo Precision Devices, Inc., a subsidiary, to manufacture special instruments and devices. Production will be carried out in new plant to be erected by parent organization on 80-acre tract near Toledo Terminal Railway line, to cost about $1,000,000 with machinery.

In connection with proposed steam-operated electric generating plant at Ashtabula, Ohio, Cleveland Electric Illuminating Co., Illuminating Building, Cleveland, will expend about $10,000,000 for generating station, switching plant, power substations and transmission lines. Company is a subsidiary of North American Co., Cleveland.

Baltimore & Ohio Railroad Co., Baltimore, is planning new terminal at Youngstown, Ohio, including engine house and repair facilities, switch tracks, etc., to cost about $2,000,000.

City Auto Stamping Co., Toledo, manufacturer of metal stampings, has filed plans for one-story plant, 230 x 300 ft., to cost over $200,000 with equipment. Langdon, Hohly & Gram, Security Bank Building, are architects, in charge.

Bessemer Limestone & Cement Co., Youngstown, Ohio, affiliated with Peerless Egyptian Cement Co., Detroit, is reported planning new storage and distributing plant at Toledo, to cost over $125,000 with mechanical handling and other equipment. Both companies are operated by Bessemer Securities Co., Youngstown.

Chicago

CHICAGO, May 13. — The local machine tool business is rallying after indications earlier in the month that sales were definitely on the down grade. The Union Pacific is in the market for about 20 machine tools, including an axle lathe, two engine lathes and a number of grinders. The Rock Island and the Chicago & North Western each will buy a drill grinder. The Pullman Car & Mfg. Corporation will purchase three planers ranging from 36 in. to 72 in. The Santa Fe continues to place orders against its list. Of special interest is word that active buying is near by farm implement and tractor manufacturers in Iowa and Central Illinois.

Price changes are more frequent and deliveries are falling back. Many standard machine tools cannot be had before September or October. One seller finds that one out of every three orders offered is lost because of extended deliveries.

Kensington Steel Co., South Chicago, Ill., will build a one-story brick foundry, 30 x 104 ft., to cost $8,000. O. C. Cherry, 53 West Jackson Boulevard, Chicago, is architect.

Burgess-Norton Mfg. Co., Geneva, Ill., manufacturer of piston pins and clutch plates, the latter product recently having been acquired by purchase of Brown-Lipe Gear Co., Toledo, will soon start erection of an addition.

Commonwealth Steel Co., Granite City, Ill., has plans for a 200-ft. addition to an existing building and enlargement of core room.

Property at Hoyne and Fulton Streets, Chicago, has been acquired by Nordendale Mfg. Co., 1638 North Paulina Street, manufacturer of tools, dies, etc., as site for two-story plant, to cost about $50,000 with equipment. Present works will be removed to new location and capacity increased.

Sall Brothers, Inc., Kishwaukee Street, Rockford, Ill., manufacturer of castings, automobile heaters, etc., has asked bids on general contract for one and two-story addition, 66 x 145 ft., and 56 x 95 ft., respectively, to cost about $100,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects.

Rath Packing Co., Waterloo, Iowa, meat packer, has plans for six-story addition,

to cost about $250,000 with machinery, including conveying and other equipment. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

Viking Pump Co. has been organized to take over and expand company of same name, Banner Brass Foundry Co. and Falls Foundry Co., all with plants at Cedar Falls, Iowa. Entire production of consolidated organization will be given over to Viking rotary pumps and parts. New company has arranged for a stock issue to total $1,420,000, part of proceeds to be used for expansion in output, including rotary fuel pumps for aircraft service. George Wyth is president.

Pillsbury Flour Mills Co., Metropolitan Life Building, Minneapolis, Minn., is said to have plans under way for new mill near Springfield, Ill., to cost over $800,000 with machinery. M. Lehman is company engineer, address noted.

Scott-Vansdach Machine Co., 4712 West Twenty-second Street, Cicero, Ill., has begun work on one-story machine shop, 75 x 125 ft., to cost about $35,000 with equipment.

Independent Can Co., 1328 West Monroe Street, Chicago, has acquired two-story factory at West Van Buren Street and Washtenaw Avenue, totaling about 20,000 sq. ft. floor space and will occupy for expansion.

Ovens power equipment, conveying and other machinery will be installed in new three-story and basement plant to be constructed by Pfaff Baking Co., Mason City, Iowa, to cost $250,000. Project will include automobile service and repair unit for company motor trucks, and loading dock.

Milwaukee

MILWAUKEE, May 13.—Despite a shrinkage in new business being placed with machine-tool builders, there is a relatively good demand for equipment and manufacturers are still obliged to quote deliveries at some distance. The rush of recent months seems to have subsided, but on the basis of the amount of business booked and the volume of unfilled orders, many buyers are apparently waiting until they receive tools ordered before making further purchases. Industrial construction in this district has slowed up, but there is a substantial amount of replacement business constantly before the trade.

Moloch Foundry & Stoker Co., Kaukauna, Wis., manufacturer of steam generating equipment, drop hammers, etc., has plans by A. A. Wickland & Co., consulting engineers, 205 West Wacker Drive, Chicago, for addition to foundry to cost about $40,000.

Merrill Machinery & Supply Co., Merrill, Wis., has changed its corporate title to Merrill Mfg. Co. Capital stock also has been increased from $75,000 to $100,000. Plant addition is in early prospect, although definite plans have not been formulated.

Atlas Boat Corporation, Menominee, Mich., has been organized by E. P. Smith, who recently acquired former plant of Michigan Refining & Preserving Co., on Menominee River and will remodel it for production of steel and wood canoes, rowboats, outboard and small sailing vessels. W. O. Welch, formerly designer for Century Boat Co., Milwaukee, and L. L. White, formerly assistant manager of same company are associated with Mr. Smith.

Milwaukee Board of School Directors, Frank M. Harbach, business manager, has placed contract with Kroening Construction Co., local, for two additional stories, 180 ft. sq., to supply, service and repair building at price of $63,880.

Tecktonius Mfg. Co., 1228 Racine Street, Racine, Wis., manufacturer of hardware specialties, has acquired Racine Appliance Co., Inc., Racine, specializing in manufacture of barbecue equipment and fixtures. Physical consolidation of plants is under way. W. G. Goodell, president Racine Appliance Co., has joined Tecktonius Co. as manager of barbecue equipment division.

Murray Body Corporation, Detroit, has accepted bid of Common Council of Racine, Wis., for purchase of plant and site of H. & M. Body Corporation, Racine, for $150,000. Buildings will be razed and site used for new municipal group. First construction contemplated is a municipal refuse incinerator. Henry A. Nelson, commissioner of public works, has been authorized to advertise for bids.

Hutter Construction Co., Fond du Lac, Wis., has general contract for new $100,000 shop building, 112 x 176 ft., one to three stories, for Washington Mould Machine & Foundry Co., Washington, Pa.

White-Way Electric Sign Co., Junction City, Wis., manufacturer of electromechanical advertising signs, marquees, canopies, etc., has moved its plant and offices to Marshfield, Wis., quadrupling its capacity. Company recently acquired Quinn Sign Co., Fond du Lac. Henry Voyer is chief owner and manager.

Walker Mfg. Co., Racine, Wis., manufacturer of automobile and heavy-duty jacks, has acquired Ajax Auto Parts Co., Racine, specializing in jacks. Both plants will be continued in operation. John W. Bate, founder and president Ajax company, becomes a director of Walker company, of which Willard T. Walker is president and treasurer.

Indianapolis

INDIANAPOLIS, May 13.—Redinger-Ball-Morris Co., Logansport, manufacturer of relays, cutouts and other electrical specialties, has plans for one-story addition, 60 x 180 ft., to cost about $30,000 with equipment. William G. Rammel, Barnes Building, is architect.

Central Indiana Gas Co., Anderson, is planning new artificial gas plant, to cost $150,000 with generating machinery and other equipment.

Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Indianapolis, will enlarge capacity of locomotive shops at Beech Grove for locomotive rebuilding and all heavy repair work in this division. Engine shops at Mount Carmel, Ill., have been closed, and all work at that point will be transferred to Beech Grove.

Electric Sprayit Co., Stephenson Building, South Bend, manufacturer of spraying equipment, has rejected bids for one-story addition and will have revised plans prepared at once. Unit will cost about $50,000 with equipment. William E. Fett, Associates Building, is architect. C. A. MacDonald is secretary.

Board of Education, Indianapolis, is considering installation of manual training equipment in Irvington high school to cost $600,000, for which bids will be asked soon on general contract. McGuire & Shook, 941 North Meridian Street, are architects.

Northern Indiana Public Service Co., Hammond, has approved plans for first unit of new steam-operated electric generating plant at Michigan City, Ind., to cost about $1,000,000 with equipment. Additional units will be constructed later. Extensions will be made in transmission lines.

Cincinnati

CINCINNATI, May 13.—Machine tool business is fairly well sustained, although the gradual recession from the high point in March continues. One important builder showed a substantial gain in sales the past week, but the majority have had a decline in the volume of bookings. Orders, however, are still being maintained far in excess of the average which has prevailed in recent years, but sales are considerably less than in the first three months of 1929.

There is much activity in the railroad field. The St. Paul has bought eight engine lathes from a local company, and the Chesapeake & Ohio is expected to complete its purchases before the end of the month. The Delaware, Lackawanna & Western has not closed against its list, but will act shortly.

Foreign business still looms large. At least two European automobile makers have engineering representatives in the United States who are considering the placing of sizable orders. A committee from the Soviet Republic is remaining in this country for an indefinite stay, working with American builders on special equipment for a large tractor plant to be located near Leningrad. However, it may be a matter of four or five months before these transactions are completed.

Highland Body Mfg. Co., Elmwood, Ohio, manufacturer of automobile truck cabs and bodies, has awarded contract to Austin Co. for new one-story sheet metal shop, 70 x 125 ft.

Cincinnati Rubber Mfg. Co., Franklin Avenue, Norwood, Ohio, has awarded contract to Austin Co. for addition to manufacture rubber rolls for paper-making machines. A 10-ton bridge crane will be installed.

Plans have been filed by Duriron Co., North Findlay Street, Dayton, Ohio, manufacturer of special alloy castings, for one-story addition, to cost about $30,000.

Columbia Gas & Electric Co., Cincinnati, will carry out an expansion and improvement program at different properties, including additional generating facilities, transmission lines and distributing systems, to cost about $20,000,000.

City Council, Miamisburg, Ohio, is reported planning extensions and betterments in municipal electric light and power plant, to cost about $70,000 with equipment.

Ducktown Chemical & Iron Co., Ducktown, Tenn., is said to be planning additions to plant near Isabella, Tenn., including sintering plant unit, acid works and other structures, to cost about $750,000 with machinery.

Walsh & Weidner Co., Chattanooga, Tenn., manufacturer of boilers, tanks and other plate products, has begun erection of one-story machine shop, 60 x 200 ft., to cost about $55,000 with equipment. Company is unit of International Combustion Engineering Corporation, New York.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, with main properties at Garden City, L. I., has approved plans for hangar, 120 x 120 ft., with repair and reconditioning shop, at airport, Louisville, to cost about $70,000 with equipment.

Plough Chemical Co., South Third Street, Memphis, Tenn., has asked bids on general contract for five-story addition, 60 x 220 ft., to cost more than $500,000 with equipment. Mechanical handling, packing, box-manufacturing and other machinery will be installed. Jackson & Moreland, 31 St. James Avenue, Boston, are engineers; Hanker & Cairns, 123 South Court Street Memphis, are architects.

Board of Education, Nashville, Tenn., is considering installation of manual training equipment in new two-story and basement junior high school, to cost about $250,000, for which bids have been asked on general contract. C. K. Colley & Co., First National Bank Building, are architects.

Gulf States

BIRMINGHAM, May 13.—Superior Incinerator Co., Dallas, Tex., manufacturer of incinerators, refuse burning equipment, etc., is planning plant near Cincinnati, where contract for incinerator apparatus has been secured, to cost more than $50,000 with equipment.

Miami Aircraft Corporation, Miami, Fla., care of Joseph M. Smoot, 4736 North Bay Road, recently formed by Mr. Smoot and associates, capital $500,000, is reported planning several one-story units on local site for parts production and assembling, to cost about $200,000 with equipment.

Texas & Pacific Railroad Co., Dallas, Tex., is planning two new freight terminals, storage and distributing buildings, with mechanical-handling equipment, at Fort Worth, Tex., to cost more than $3,000,000

Gulf States Utilities Co., Beaumont, Tex., operating electric light and power properties, is disposing of bond issue of $9,000,000, part of fund to be used for expansion in plants and transmission lines.

Ferris Tractor Co., Dallas, Tex., recently formed by J. W. and F. A. Ferris, is planning storage and distributing plant, with parts and repair facilities. Company will distribute tractors and other farm machinery of United Tractor & Equipment Corporation, covering north and west Texas.

Coca-Cola Bottling Co., 1010 Gurnee Street, Gadsden, Ala., has plans for two-story and basement bottling works, to cost about $90,000 with automatic bottling machinery, conveying apparatus and other equipment. Pringle & Smith, Norris Building, Atlanta, Ga., are architects.

Humble Oil & Refining Co., Houston, Tex., has authorized construction of new gasoline refining plant near Luling, Tex., to cost more than $150,000 with equipment, pipe lines and distributing facilities.

Fort Pierce Financing & Construction Co., Fort Pierce, Fla., has plans for new refrigerating and precooling plant, to cost about $100,000 with machinery. Parsons, Klapp, Brinckerhoff & Douglas, 84 Pine Street, New York, are consulting engineers.

Choctaw Clay Corporation, 608 Pere Marquette Building, New Orleans, R. J. Wilkinson, president, has plans for new plant for production of oxidized clay, Fuller's earth and other refined raw materials at Needham, Ala., where property has been secured. Installation will include mechanical washing equipment, refining plant, storage and distributing units. Company will also establish works for production of insulated brick. Entire project will cost over $350,000 with equipment. L. M. Dalgarn, Louisiana Building, New Orleans, is engineer.

Galveston Wharf Co., Galveston, Tex., has authorized extensions in grain elevator B, with installation of elevating, conveying, screening and other equipment, to cost about $1,000,000.

Texas Aero Corporation, Temple, Tex., Charles M. Campbell, head, recently noted in these columns as Temple Aero Corporation, has acquired property at Love Field, Dallas, for new plant for parts manufacture and assembling, to cost about $75,000 with equipment. Work will be started within 30 days. Alvin M. Owsley, Dallas, is vice-president.

C. E. Burgoon, city manager, Hollywood, Fla., will receive bids until June 11 for pumping machinery, standpipe or elevated tank, carbon dioxide generating plant, and other equipment for municipal waterworks. Gilbert C. White Co., Charlotte, N. C., is engineer.

St. Louis

ST. LOUIS, May 13.—Plans are under way by Curtiss-Robertson Airplane Mfg. Co., Lambert Field, St. Louis, for new units to cost about $400,000 with equipment, for parts production and assembling of six-passenger, two-motored cabin monoplane for Curtiss Aeroplane & Motor Corporation, Buffalo, an associated organization. Company is arranging for increase in capital from 30,000 to 100,000 shares of stock, no par value, part of fund to be used for expansion.

American Body & Auto Repair Corporation, St. Louis, care of Alois W. Strubel, 5023 Tholozen Street, recently formed by Mr. Strubel and associates, plans operation of automobile body and repair works.

City Council, Lees Summit, Mo., is considering installation of municipal electric light and power plant, to cost about $100,000 with machinery. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Manhattan Motors Co., 312-14 Houston Street, Manhattan, Kan., has plans for two-story service, repair and garage building, to cost about $100,000 with equipment. Arthur H. Prewer, 7514 Hilldale Street, Chicago, is architect.

Union Electric Light & Power Co., St. Louis, has engaged Stone & Webster Engineering Corporation, 49 Federal Street, Boston, engineer, to prepare plans for hydroelectric generating plant on Osage River, near Bagnell, Mo., with initial capacity of 120,000 kw., to cost about $25,000,000 with transmission system. Company is also arranging an expansion program at other points to cost over $50,000,000.

Universal Aviation Corporation, 430 Gray Street, St. Louis, Halsey Dunwoody, head, has plans by Love-Sultan, Inc., 6625 Delmar Boulevard, engineer, for two hangars, 155 x 175 ft., with repair and reconditioning facilities in Fairfax industrial district, Kansas City, Mo., to cost about $125,000 with equipment.

Von Hoffman Aircraft Co., 103 South Ninth Street, St. Louis, Albert Von Hoffman, head, is completing plans for hangar, with repair and reconditioning facilities, at St. Louis flying field, Anglum, Mo., to cost about $50,000 with equipment. B. Russell Shaw, Arcade Building, is architect.

Kansas City Structural Steel Co., Twenty-first Street and Metropolitan Avenue, Kansas City, Kan., has plans for one-story addition, for storage and distribution, to cost about $50,000 with equipment.

McKecknie & Trask, Board of Trade Building, Kansas City, Mo., architects, have plans for eight-story and basement automobile service, repair and garage building, to cost over $175,000 with equipment.

Laclede Gas Light Co., St. Louis, will erect a 10,000,000-cu. ft. gas holder to serve northwest industrial district of St. Louis, to cost between $500,000 and $750,000 with pumping station and boilers.

Pacific Coast

SAN FRANCISCO, May 9.—Contract has been let by Ingersoll-Rand Co., San Francisco, manufacturer of mining machinery, air compressors, etc., to Vogt & Davidson, 185 Stevenson Street, for a three-story factory branch and distributing plant, 75 x 80 ft., to cost $50,000 with equipment. Walter Falch, Hearst Building, is architect.

Curtiss Flying Service, 1240 Pacific Mutual Building, Los Angeles, Major C. C. Moseley, representative, has authorized plans for flying school and air terminal structures at Mines Field, near Inglewood, Cal., to cost over $85,000 with equipment. Gable & Wyant, 1723 Wilshire Boulevard, are architects.

Modern Furniture Co., 733 Aliso Street, Los Angeles, has plans for new one-story factory, 160 x 260 ft., at Long Beach, Cal., to cost more than $100,000 with equipment. R. D. Van Alstine, Heartwell Building, is architect.

Modesto Irrigation District, Modesto, Cal., C. S. Abbott, secretary, will receive bids until May 27 for power plant equipment, including Diesel-engine-drive electric generating units, auxiliary air compressor set, pumping equipment, air filter, and complete auxiliary equipment.

Imperial Valley Mining Co., Holtville, Cal., H. H. Davenport, president, has purchased property at El Centro, Cal., as site for new milling plant, to cost about $100,000 with machinery.

Pacific Cottonseed Products Corporation, Tulare, Cal., has plans for new plant near local yards of Southern Pacific Railroad, to cost about $50,000 with equipment.

Ace Sheet Metal Works, 44 Clementine Street, San Francisco, has awarded general contract to Spivock & Spivock, Hobart Building, for two-story building to cost about $25,000. Part of unit will be used for storage and distribution. J. H. McFarland, Hobart Building, is architect.

West Coast Casket Co., 1495 East Fourth Street, Los Angeles, has plans for one-story factory, 90 x 250 ft., to cost about $75,000 with equipment. Frank D. Harrington, H. W. Heilman Building, is architect.

Puget Sound Power & Light Co., Seattle, has plans for construction of second unit of steam-operated electric power plant on Lake Washington, near Renton, Wash., to cost over $2,000,000 including transmission lines. W. D. Shannon is chief engineer.

Oliver Machinery Co., Grand Rapids, Mich., manufacturer of wood-working machinery and machine tools, has moved

its Seattle office to First Avenue, South, and King Street, where Perine Machinery Co. has its offices and showroom.

Southwest Welding & Mfg. Co. is occupying its new plant at 3201 West Mission Road, Alhambra, a suburb of Los Angeles.

Hall Metal Products Co., Torrance, Cal., has been organized to manufacture sheet metal products for roofing purposes, and also for airplane industry.

Canada

TORONTO, May 13.—Single machine tool sales for replacement are fairly numerous, but no lists have appeared recently for new works. The automotive industry and the railroads are frequent buyers and a good demand for equipment is coming from the mining fields.

City Council, Brantford, Ont., contemplates purchasing following equipment for waterworks plant: Two or three crude oil-driven electrical generators with combined output of 800 to 850-hp., to serve as reserve pump; 500,000-gal. gravity water filtration plant, three 50,000,000-gal. low-lift motor-driven centrifugal pumps; three high-lift centrifugal pumps, one motor.

Township Council, Etobicoke, Ont., will build a waterworks pumping station and purchase equipment. Christie & Beatty, Court House, Orangeville, Ont., are engineers.

Hayes Wheels & Forgings, Ltd., Raleigh Street, Chatham, Ont., is contemplating erection of an addition. William Kistler is superintendent.

Woburn De-Greasing Co., Waukegan, Ill., is planning to build a plant at Don Valley, Toronto. G. G. Curry, 510 Federal Building, Toronto, is local representative of company.

Jones Brothers Co., Head Street, Dundas, Ont., manufacturer of office furniture, barbers' supplies, etc., has let general contract for an addition to E. H. Greenwood, 286 Hatt Street, to cost $25,000.

Stanley Steel Co., Ltd., Gerrard Street, Hamilton, Ont., has awarded general contract to Frid Construction Co., 6 Highson Street, North, for a one-story addition to cost $60,000. A second addition to cost $40,000 will be started in July.

Cunningham Sheet Metal Works, 69 Lincoln Road, Walkerville, Ont., has awarded general contract to Border Construction Co., Ltd., Imperial Bank Building, for one-story addition. McElroy & McIntosh, Universal Building, are architects.

Smith Brothers, Toronto, manufacturers of motor bodies, etc., have applied for permit for erection of a plant on Logan Avenue to cost $75,000.

Western Canada

Dominion Bridge Co., will start work immediately on structural steel plant, 69 x 416 ft., on site of Riverside Iron Works Co., Ltd., East Calgary, Alberta, to cost $80,000.

Sutherland Construction Co., general contractor, has started work on addition, 122 x 125 ft., to plant of Vulcan Iron Works, Winnipeg, and two-story power house, 42 x 53 ft.

E. B. Eddy Co., Hull, Que., contemplates erection of a plant at Calgary, Alberta, to manufacture matches. A 40 acre site has been secured.

Foreign

AN expansion program to cost about $15,000,000 will be carried out by Cerro de Pasco Copper Co., 44 Wall Street, New York, at its properties in Peru, over a period of 36 to 42 months. Work will include a hydroelectric power plant on Montaro River, near Oroya, with transmission system for service at mines and mill, to cost about $6,500,000; electrolytic zinc mill at Oroya, and two new concentrating mills; refinery at Yauricocha mining properties, with tramway system, installation of mechanical shops for equipment repairs and other operating structures. E. H. Clark is president.

General Motors w Polsce, S. A., Warsaw, Poland, a subsidiary of General Motors Corporation, Detroit, is arranging for purchase of site near Warsaw for new assembling plant for Chevrolet and other automobiles. Present plant in that district, now occupied under lease, will be removed to new works and additional equipment provided for more than double output. W. L. Pawlowski, managing director of subsidiary company, will leave for United States before close of month to arrange details with officials of parent company. American Polish Chamber of Commerce, 953 Third Avenue, New York, has information regarding project.

American & Foreign Power Co., operated by Electric Bond & Share Co., 2 Rector Street, New York, has purchased power plant and property of Durango de Luz Electrica, S. A., Durango, Mexico, and will operate with other properties in that district. Present power plant will be extended and additional equipment installed. Company is also planning early construction of hydroelectric power plant near Mezquital, with transmission lines to municipalities and mining centers within radius of 150 miles, to cost about $4,000,000. Plans are under way for enlargements in electric power plant and system at Merida, Yucatan, recently purchased from S. Pearsons & Sons, Ltd., with installation of additional equipment.

National Telegraph System Division, Government of Mexico, Mexico City, has authorized construction of radio station on local site, for communication with United States, South America and points in Europe, to cost about 1,400,000 pesos ($700,000), including power station, steel towers, broadcasting and receiving equipment, etc. Bids will be asked at once.

New Trade Publications

Electric Furnaces. — Ajax Electrothermic Corporation, Trenton, N. J. Bulletin No. 4a is a four-page leaflet describing the company's 3KV-A converter and high-frequency furnaces. It deals particularly with a small furnace for special uses giving the principle of operation. There is also a description of a conical furnace, as well as a graphite muffle furnace, for heating ceramic specimens.

Better Chromium Plating.—Bulletin No. 972, C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., describes seven different methods for automatic temperature control of chromium plating baths.

Tool Steel.—Hand book, fourth edition, Columbia Tool Steel Co., Chicago Heights, Ill. New data include conversion charts for various systems of hardness numbers.

Diesel Angle Compound Compressors. —Sullivan Machinery Co., Chicago. Bulletin No. 83-L describing Sullivan angle compound compressors for Diesel engine operation. These compressors are built in sizes ranging in capacity from 400 to 600 cu. ft. free air per min. The booklet illustrates and describes various installations.

Heat-Treating Furnaces. — General Electric Co., Schenectady, N. Y. Bulletin GEA-37D, superseding GEA-37C, in its four pages describes direct heating electric furnaces, types RRB and RRC. These furnaces are for heat treating, carburizing and annealing various metals and other heating operations, requiring temperatures below 2000 deg. Fahr. The pamphlet is illustrated and a list of users of these furnaces is presented.

Shell-End Milling Tools.—National Twist Drill & Tool Co., Detroit. Circular covering deep-counterbore shell-end mills, with illustrations including dimensioned views for sizes from 1¼-in. to 6-in. diameter.

Heat Treatment.—Stanley P. Rockwell Co., Hartford, Conn. Bulletin No. 2904 on its one page discusses "The Rockwell Dilatometer for Precision Heat Treatment Speeds Up Production." It tells of three methods of increasing output resulting from the use of the Rockwell dilatometer.

Rubber-Mounted Motor. — Wagner Electric Corporation, St. Louis. Bulletin No. 163 on rubber-mounted motors in ratings of 1/6, 1/4 and 1/3 hp. Bulletin goes into detail regarding the changes in motor design embodied in these new motors, changes in the rotor, governor weights and frame, as well as in the method of mounting, all of which have been done to eliminate noise in starting, running and stopping.

Skid Platforms.—Lewis-Shepard Co., Watertown, Mass. Bulletin of six pages dealing with skid platforms made of corrugated pressed steel. The corrugations are in the shape of stiffening ridges projecting internally. The platforms are made in a series of widths from 24 to 48 in.; lengths from 24 to 78 in., and heights from 6½ to 12 in. and in five gages of stock. Corrugated pressed steel boxes for use on the platforms are made of 12-gage steel to fit the platforms of all sizes except the greatest length and greatest width. The boxes have depths from 6 to 30 in.

Precision Testing Equipment.—Adam Hilger, Ltd., London, N. W. 1, England. Pamphlets on Professor Coker's equipment for determining distribution of internal stress in structures and machine parts by the examination of celluloid models under polarized light. Also a gage for measuring the lateral contraction of a plate or test piece when subject to tension stresses.

Control of Chromium Plating.—Bristol Co., Waterbury, Conn. Bulletin No. 367 shows photographs and diagrams of installations for control (either by hand or automatic) of temperature in chromium-plating tanks.